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DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Bureau of Sport Fisheries and Wildlife
Washington 25, D. C.

1958 STATUS REPORT OF WATERFOWL

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Special Scientific Report -- Wildlife No. 40

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Note: This information has been hurriedly compiled both in the field and in Washington. Also, the report has not had the benefit of proof-reading or editing and should be regarded as subject to correction. The information contained in this report is for administrative use and is not for publication without permission of the contributing agency.

INTRODUCTION

Each year during early August the waterfowl shooting regulations for the fall season are established. At that time current information regarding the status of the population must be available to Game Administrators to provide a sound basis for the determinations.

Three surveys are conducted annually for the purpose of ascertaining waterfowl population status. These are: (1) a January survey of the continental wintering areas to measure the distribution and relative number of birds remaining after the close of the previous shooting season; (2) a survey among waterfowl hunters immediately following the shooting season to measure the size of the kill and the effect of hunting regulations on hunter activity and kill; and (3) a survey of the major continental breeding areas during May, June and July to measure size and distribution of the breeding population and the relative number of young produced.

This report summarizes the results of the three surveys and presents a forecast of anticipated change in the relative size of the 1958 fall flight of ducks, geese, brant, and coot in each of the waterfowl flyways in the United States.

SCOPE OF INVESTIGATIONS AND METHODS USED

Winter Survey

During recent years the survey of waterfowl wintering grounds has included the major wintering areas in Alaska, Canada, United States, and Mexico. In January 1957, due to circumstances beyond our control, it was not possible to carry out the survey in Mexico. Although the Mexican survey was conducted in January 1958, data are not available for making a comparison between 1957 and 1958 in this important wintering area.

In the United States, the Bureau of Sport Fisheries and Wildlife organized the surveys, but much of the field work was carried out by personnel of the 48 State Conservation Agencies. In Alaska the survey was carried out by Bureau personnel, while in Canada the Canadian Wildlife Service organized the survey and the field work was conducted by personnel of that Agency and the Provinces.

The wintering areas were surveyed by means of boats, cars and planes, with all important areas being covered from the air. Information as to personnel, equipment, and distances traveled, is presented in the following table:

Participation in 1958 Winter Waterfowl Survey

Location	Number Observers				Aerial Coverage				Miles Driven
	U. S.	State	Other	Total	Number Planes	Hours Flown	Miles Flown		
Pacific Flyway	47	294	3	344	34	176	17,370		?
Central Flyway	?	?	?	435	36	259	22,915		44,750
Mississippi Flyway	85	795	12	892	49	253	23,756		51,231
Atlantic Flyway	40	122	23	185	31	274	18,998		6,477
TOTAL U. S.	172	1,211	38	1,856	150	962	83,039		102,458

Winter Survey - Continued

Location	Number Observers				Aerial Coverage				Miles Driven
	U. S.	State	Other	Total	Number Planes	Hours Flown	Miles Flown	Miles Driven	
Alaska	4	-	-	4	1	12	1,400	-	
Canada	?	?	?	?	?	?	?	?	
Mexico	4	1	-	5	2	106	13,780	-	
GRAND TOTAL	180+	1,211+	38+	1,865+	153+	1,080+	98,219+	102,458+	

Breeding Population and Production Surveys

The extensive breeding ground surveys initiated several years ago have been continued. These surveys now include two coverages of most of the important waterfowl breeding areas, the first coverage occurring in May for the purpose of measuring the distribution and relative size of the breeding population, and the second being made during July for the purpose of measuring the production of broods. A combination of data from important breeding areas forms the primary basis for forecasting changes in the relative size of the fall flight in each of the four flyways.

The bulk of the important waterfowl breeding areas in Alaska and Canada are surveyed from the air using statistically designed sampling techniques and similar methods of collecting and analyzing data. Survey methods vary somewhat among the 25 States conducting surveys, although the methods employed in the majority of States with important numbers of breeding ducks are similar in most respects to those employed in Canada and Alaska.

In 1958, aerial crews sampled approximately 2,375,000 square miles of the best duck breeding habitat on the continent. Ducks were counted on approximately 16,000 square miles of habitat, or somewhat less than one percent of the total breeding area. Although this may seem like a rather small portion of the total, sampling error was less than 20 percent of the average population density in most survey areas, and was considerably less than 20 percent when considering the breeding range as a whole.

The results of the breeding ground surveys are presented as "index" figures. When conducting aerial surveys of breeding birds, or of broods, not all birds present are seen and recorded. No attempt has been made to estimate the number which have been missed. The indices, therefore, are based on birds actually seen, and it is emphasized that they do not constitute an estimate of total population present. The "index" figures are not a measure of total populations, but they are representative of relative population levels to the extent that data from one location can be compared with those from another, and year-to-year changes can be detected. Although a measure of total population would have certain advantages, a determination of relative change is adequate for practical management.

The breeding ground surveys are cooperative in nature. The Bureau of Sport Fisheries and Wildlife, the Canadian Wildlife Service, the provincial game branches, and Ducks Unlimited, combine their manpower and equipment to cover all of the important waterfowl breeding areas in Canada. Bureau biologists cover the important areas in Alaska, while the State conservation agencies, with some help from the Bureau, carry on surveys in about 25 States.

Kill Survey

Each year following the shooting season the Bureau carries out a mail questionnaire survey among waterfowl hunters for the purpose of determining the number of birds killed and relationships between hunting regulations, hunter activity, and harvest. The specific objectives are as follows:

1. To estimate for each Flyway the kill of ducks, geese, and coots with a standard error of not to exceed 5 percent in the estimate of all ducks bagged.
2. To estimate total numbers of potential and active waterfowl hunters.
3. To estimate number of times the average hunter went afield during the season and the distribution of hunting activity through the season.
4. To estimate number of banded waterfowl that are bagged.
5. To estimate the geographic and density distribution of hunters in the areas of waterfowl hunting.

The survey functions through the cooperation of the Post Office Department and provides for a sampling of the hunters in each flyway in proportion to their occurrence in the various States. Mailing addresses for the questionnaire survey are obtained at the time duck stamps are purchased at a series of randomly selected post offices. The questionnaires are mailed out on the closing date of the shooting season in each State. Three weeks later, a follow-up questionnaire is sent to those who have not answered the first questionnaire. The number of questionnaires mailed out and the number returned in each Flyway are shown in the following table:

1957-58 Sample

Flyway	No. of Hunters		No. of Hunters		Percent	
	Receiving Questionnaires	57 - 58	Responding	56 - 57	57 - 58	56 - 57
Atlantic	15,804	10,287	11,160	7,125	70.6	69.3
Mississippi	15,022	10,374	10,226	7,542	68.1	72.7
Central	8,087	6,809	5,386	4,685	66.6	68.8
Pacific	6,634	7,478	4,743	5,284	71.5	70.7
TOTAL	45,547	34,948	31,515	24,636	69.2	70.5

In addition to sampling errors, mail-questionnaire data contain response bias errors which result in an inflated estimate of kill. Experience has shown that these response errors are not consistent in size from one area to another nor from one year to the next in the same area. Also, they are large as compared to sampling error and their presence seriously limits the usefulness of survey data unless they are removed.^{1/}

Methods for removing response bias errors have been developed^{2/} and the kill data presented in this report have been adjusted in accordance therewith.

^{1/} E. L. Atwood, Validity of Mail Survey Data on Bagged Waterfowl, Journal of Wildlife Management, Vol. 20, No. 1, pp. 1-16.

^{2/} E. L. Atwood, A Procedure for Removing the Effect of Response Bias Errors from Waterfowl Questionnaire Responses, Biometrics, Vol. 14, No. 1, March 1958.

Pacific Flyway DataWaterfowl Kill Information

The following table presents the estimated number of waterfowl bagged and waterfowl knocked down but not retrieved during the 1956-57 and 1957-58 shooting seasons as determined by the Waterfowl Hunter Mail Survey:

Species	1957-1958	1956-1957	Percent Change 1956-1957 to 1957-1958	
			/	-
Mallard	1,118,708	874,266	/	27.96
Pintail	794,134	553,402	/	43.50
American Wigeon	332,918	347,893	-	4.30
G-W Teal	308,336	302,746		N.C.
Shoveler	140,575	157,501	-	10.75
Canvasback	69,786	56,935	/	22.57
B-W Teal	67,841*	61,095*	/	11.04
Ruddy	49,997	66,651	-	24.99
Scaup	40,316	36,377	/	10.83
Redhead	30,641	23,589	/	29.90
Bufflehead	18,264	16,777	/	8.86
Gadwall	29,547	27,849	/	6.10
Goldeneye	21,204	36,938	-	42.60
Cinnamon Teal	41,264*	35,415*	/	16.52
Merganser	12,390	16,643	-	25.55
Scoter	5,613	3,395	/	65.33
Wood Duck	9,135	10,834	-	15.68
Ringneck	4,630	2,266	/	104.32
Others	670	330	/	103.03
Total Ducks Retrieved	3,095,968	2,630,902	/	17.68
Total Ducks not retrieved	591,372	422,005	/	40.13
Total Duck kill	3,687,340	3,052,907	/	20.78
Canada Goose	100,507	91,442	/	9.91
Snow Goose	82,422	67,455	/	22.19
Cackling Goose	69,421	54,092	/	28.34
White-fronted Goose	59,782	54,906	/	8.88
Brant Goose	11,948	18,721	-	36.18
Others	593	-		-
Total Geese retrieved	324,673	286,616	/	13.28
Total Geese not retrieved	52,961	44,329	/	19.47
Total Goose kill	377,634	333,945	/	13.08
Total retrieved Coot	171,781	150,585	/	14.08
Total Coot not retrieved	51,780	38,005	/	36.25
Total Coot kill	223,561	188,590	/	18.54

* It is probable that both Blue-winged and Cinnamon Teal are included in the estimates for each of these species since the coloration of the female in these species is identical. The net error resulting from this misclassification is unknown.

Pacific Flyway Data

Number of Hunters, Average Times Hunted, Seasonal Bag, Seasonal Unretrieved Kill and Daily Bag as Determined by the Waterfowl Hunter Mail Survey.

				Percent Change 1956-1957 to 1957-1958
		1957-1958	1956-1957	
Number of Potential Hunters				
Over 15*		409,719	396,921	+ 3.22
Under 16		<u>28,638</u>	<u>42,192</u>	- 32.12
		<u>438,357</u>	<u>439,113</u>	N.C.
Number of Active Hunters**				
Over 15		347,722	316,979	+ 9.70
Under 16		<u>22,527</u>	<u>31,231</u>	- 27.87
		<u>370,249</u>	<u>348,210</u>	+ 6.33
Average Times Hunted**		4.303	4.327	N.C.
Average Seasonal Bag**				
<u>Over 15</u>	Ducks	8.691	7.925	+ 9.67
	Geese	.908	.876	N.C.
	Coot	.451	.414	+ 8.94
<u>Under 16</u>	Ducks	3.276	3.804	- 13.88
	Geese	.393	.284	+ 38.38
	Coot	.666	.620	+ 7.42
Average Seasonal No. not retrieved**				
<u>Over 15</u>	Ducks	1.654	1.242	+ 33.17
	Geese	.148	.134	+ 10.45
	Coot	.120	.099	+ 21.21
<u>Under 16</u>	Ducks	.694	.911	- 23.82
	Geese	.059	.059	N.C.
	Coot	.445	.220	+ 102.27
Average Daily Bag**				
<u>Over 15</u>	Ducks	2.020	1.832	+ 10.26
	Geese	.211	.202	+ 4.46
	Coot	.105	.096	+ 9.38
<u>Under 16</u>	Ducks	.761	.879	- 13.42
	Geese	.091	.066	+ 37.88
	Coot	.156	.143	+ 9.09

* Individuals who purchased a Duck Stamp with intent to hunt.

** Individuals who hunted at least once.

Winter Trend Data - Pacific Flyway

As mentioned in the section under Scope of Investigations and Methods Used, it was not possible for the Bureau of Sport Fisheries and Wildlife to conduct the winter survey in Mexico in January 1957. Since there is some variation in the proportion of some species of Pacific Flyway waterfowl that winter in Mexico from year to year, there is some question as to the degree to which the data taken in Alaska, Canada, and the United States represents trends in the wintering population for the entire flyway. This is particularly true with the pintail, gadwall, bald-pate, shoveler, green-winged teal, redhead and scaup. Mallards, most of the geese, swan, and the bulk of the coot winter in the United States and Canada, so it is likely that the data for these species is reasonably reliable as indicators of trends in wintering population.

Although it was not possible for Bureau representatives to make the regular waterfowl survey at the scheduled time, it was possible for waterfowl technicians from California to make a special survey trip in February 1957 to census the black brant areas in Baja California (Mexico). The data for black brant, therefore, are comparable to 1957.

The percent change in population between 1957 and 1958 is presented in the following two tables. The two graphs which follow present 10-year period 1949 through 1958 based on comparable coverage.

Percent Change in Pacific Flyway Population Index Figures for Ducks, Geese, Brant, Swan, and Coot - January 1957 to January 1958
(Comparable Coverage)

Area	Ducks	Geese	Brant	Swan	Coot	Total
Alaska	+ 3	+ 2				+ 3
Canada*	+ 58	- 18	- 16	+ 48	+ 159	+ 64
Pacific Flyway States	+ 34	+ 10	- 6	+ 16	- 16	+ 26
Baja California (Mexico)			- 12			
TOTAL	+ 34	+ 10	- 10	+ 16	- 16	+ 26

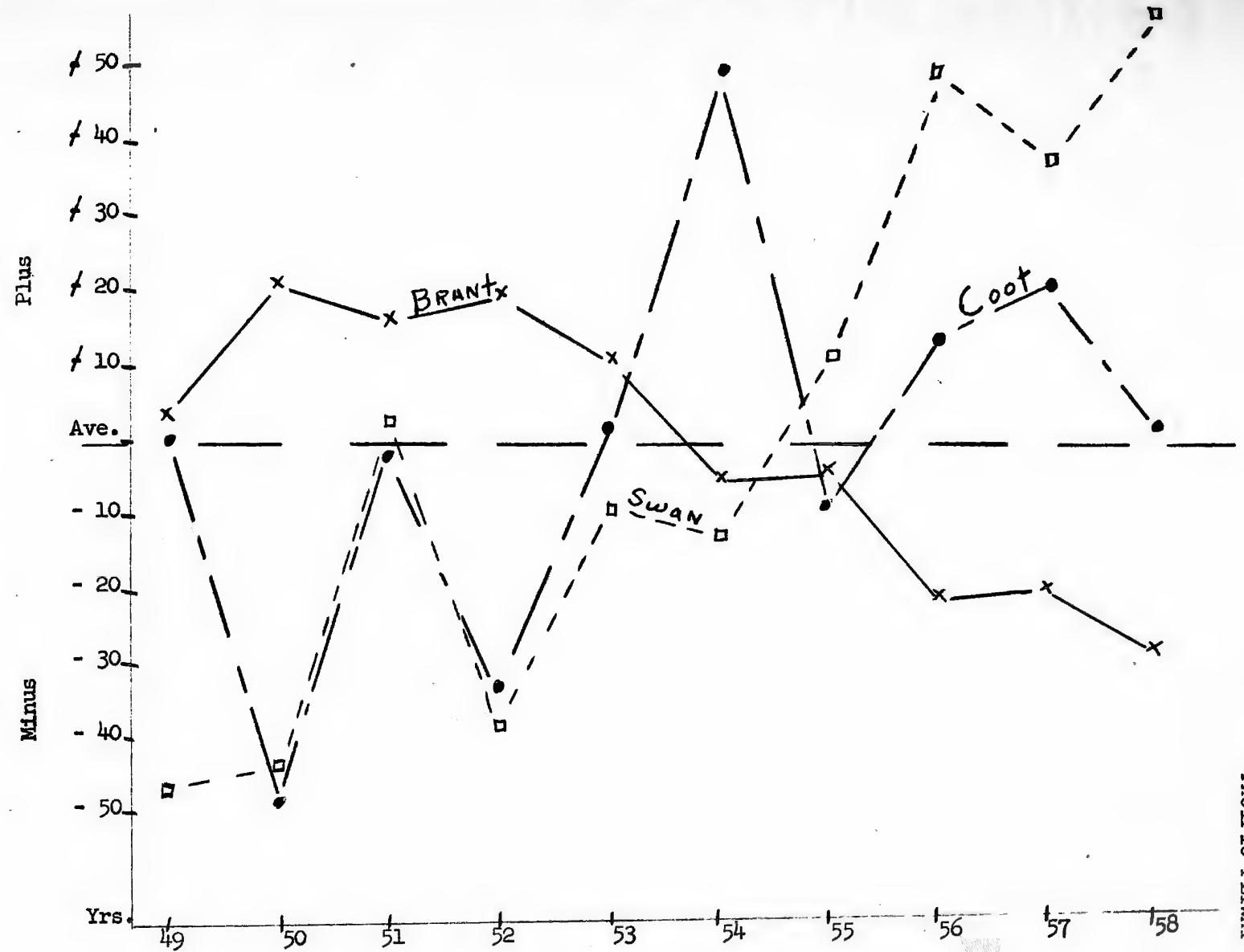
* British Columbia

Species Composition - Pacific Flyway - 1957 and 1958
 (Comparable Coverage)

Species	Percent of Birds Identified		Percent Change
	1957	1958	
Pintail	30.0	31.7	+ 33.7
Mallard	22.1	23.9	+ 37.1
Coot	11.6	7.8	- 15.5
Baldpate	10.1	13.4	+ 68.3
Snow Goose	4.9	3.5	- 9.7
Green-winged Teal	2.7	2.8	+ 32.7
Scaup	2.5	1.6	- 22.2
Canada Goose	2.5	2.0	N.C.
Canvasback	2.2	1.6	- 7.8
Shoveler	2.0	2.7	+ 66.4
Black Brant	1.9	1.4	- 9.8
Cackling Goose	1.6	2.1	+ 72.9
White-fronted Goose	1.3	1.3	+ 30.3
Scoter & Eider	1.2	.9	N.C.
Ruddy	1.1	1.1	+ 24.9
Goldeneye	.6	.4	- 14.9
Whistling Swan	.6	.6	+ 16.9
Merganser	.3	.2	+ 6.5
Bufflehead	.2	.3	+ 113.9
Gadwall	.2	.4	+ 198.2
Blue-winged Teal	.2	Tr.	- 90.0
Ross' Goose	.1	.1	N.C.
Redhead	.1	.1	+ 75.8
Ringneck	Tr.	.1	-
Emperor Goose	Tr.	-	-
Wood Duck	Tr.	Tr.	-
Trumpeter Swan	Tr.	Tr.	- 11.8
Old Squaw	Tr.	Tr.	-
TOTAL	100.00	100.00	+ 25.5

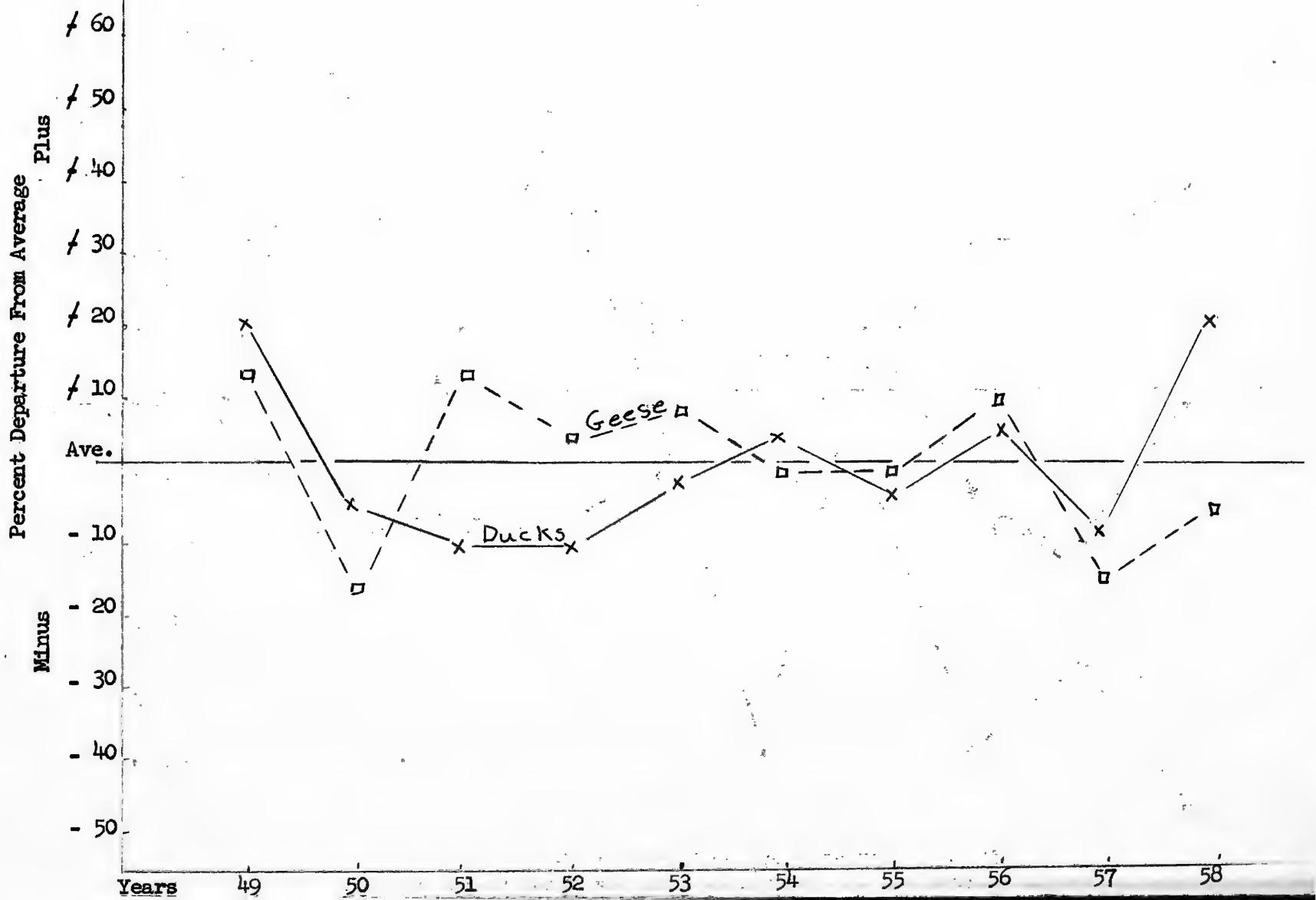
Trend in Brant, Swan, and Coot Populations in the Pacific Flyway
1949 Through 1958 (Comparable Coverage)

Percent Departure From Average



Trend in Duck and Goose Populations in the Pacific Flyway
1949 Through 1958 (Comparable Coverage)

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ALASKAWeather and Water Conditions

Winter weather was exceptionally mild in Alaska with much less snow than normal. Following low precipitation of the year before, this left the surface water development in the lowest condition recorded for the past several years. Usually there is too much surface water in some areas for optimum nesting conditions. Under no foreseeable circumstances could lack of water be a limiting factor in the far north, however.

The spring breakup was earlier than usual in all of Alaska except on the Seward Peninsula, Kotzebue Sound and Arctic coast. In these north-westward areas the breakup did not occur until the first week in June. Consequently, many of the ducks were still concentrated near the river mouths and other small areas of open water. Following the breakup, the weather continued warm and dry creating excellent nesting conditions.

Breeding Population Indices

All the data summarized in the accompanying tables are comparable between 1957 and 1958. An accounting has been made for the change in observers. There was a sizeable increase in all the major species except bufflehead and canvasback. The latter species were down about 20 percent and 80 percent, respectively, but neither contribute appreciably to the total population under normal conditions. Overall the total breeding population was up 25 percent, game ducks and non-game species in equal proportions. Pintails and widgeons showed the greatest increase, 33 percent and 37 percent, respectively. (Table 2)

Table 3 summarizes the species composition. The non-game species comprise roughly one-third of the total breeding population as derived from aerial surveys.

Table 1--Statistical Summary, Alaska Waterfowl Breeding Population, 1958

Stratum Number	Location	Area Sq. mi.	No. of 16-mi. x-sects	Sq. mi. Sampled	Mean Density Ducks per sq. mi.		Population Index		Population Index	
					1957	1958	1957	1958	1957	1958
II	Tanana-Kuskokwim	8,900	14	56						
	Nelchina	2,250	7	28						
	Innoko	1,000	2	8						
	Kenai-Susitna	3,000	12	48						
	Total	15,150	35	140	8.9	5.5	107,800	83,530	90,380	70,165
	Nelchina	1,750	8	32						
	Ft. Yukon	3,000	2	8						
	Koyukuk	4,650	10	40						
	Bristol Bay	9,200	15	60						
	Innoko	2,500	6	24						
III	Yukon Delta	17,500	35	140						
	Noatak	550	2	8						
	Seward Pen.	2,000	11	44						
	Beetles	1,200	3	12						
	Total	42,350	92	368	14.5	17.7	589,700	751,280	360,250	521,560
	Ft. Yukon	2,800	14	56						
	Yukon Delta	8,700	15	60						
	Kotzebue Sd.	4,800	12	48						
	Norton Bay	700	5	20						
	Total	17,000	46	184	21.0	33.2	356,700	564,065	256,300	421,400
V	Minto	950	6	24						
	Northway	700	7	28						
	Copper Delta	300	5	20						
	Total	1,950	18	72	32.4	40.2	53,600	78,400	51,400	77,400
	ALASKA Total	76,450	191	764	15.5	19.3	1,107,800	1,477,275	758,330	1,090,525

Table 2--Waterfowl Breeding Population Index, Comparative Data, 1957-1958

Species	Stratum II 1957 1958		Stratum III 1957 1958		Stratum IV 1957 1958		Stratum V 1957 1958		Total 1957	Total 1958	Trend
Scaup	54,450	37,340	201,000	258,750	161,300	265,700	25,400	25,700	442,150	587,490	+25%
Pintail	8,750	15,035	103,900	132,785	65,000	109,500	6,300	15,290	183,950	272,610	+33%
Mallard	5,500	4,425	22,400	22,000	9,300	17,500	8,700	19,050	45,900	62,975	+27%
Baldpate	4,300	1,750	18,250	31,110	5,400	15,800	5,100	4,000	33,050	52,660	+37%
Bufflehead	13,100	7,190	4,150	1,520	2,500	2,800	3,100	7,130	22,850	18,640	-18%
Shoveller	-	-	550	2,280	-	5,600	-	1,650	550	9,530	-
Teal	1,080	1,750	3,550	760	700	1,700	600	2,575	5,930	6,785	-
Goldeneye	3,200	2,675	550	835	2,800	1,700	1,400	1,000	7,950	6,210	-
Canvasback	-	-	5,900	1,520	9,300	1,100	800	775	16,000	3,395	-80%
Gadwall	-	-	-	-	-	-	-	230	-	230	-
Scoter	17,420	13,365	178,500	221,560	67,500	88,000	1,600	1,000	265,020	323,925	+18%
Old Squaw	-	-	50,650	78,160	25,000	29,900	600	-	76,250	108,060	+30%
Eider	-	-	300	-	7,900	24,200	-	-	8,200	24,200	-
Merganser	-	-	-	-	-	565	-	-	-	565	-
TOTAL	107,800	83,530	589,700	751,280	356,700	564,065	53,600	78,400	1,107,800	1,477,275	+25%

Table 3--Species Composition, Aerial Survey, 1958

Stratum	Total Ducks	Scaup	Pintail	Mallard	Baldpate	Bufflehead	Shoveller	Teal	Goldeneye	Canvasback	Gadwall	Scoter	Old Squaw	Eider	Merganser
II	83,530	44.7	18.1	5.5	2.1	8.9	-	2.1	3.3	-	-	15.2	-	-	-
III	751,280	34.4	17.7	2.9	4.1	0.2	0.3	0.1	0.1	0.2	-	29.5	10.4	-	-
IV	564,065	47.1	19.4	3.1	2.9	0.5	0.9	0.3	0.3	0.2	-	15.6	5.3	4.3	-
V	78,400	32.8	19.5	24.3	5.1	9.1	2.1	3.3	1.3	1.0	tr.	1.3	-	-	-
TOTAL	1,477,275	39.8	18.4	4.3	3.5	1.3	0.6	0.4	0.4	0.2	tr.	21.9	7.4	1.7	tr.

Production Surveys

As of July 24, 212 broods had been tallied in the Northway Study Area averaging 7.5 young per brood all age classes combined. This is a slightly larger brood size than was recorded last year and there appeared to be at least 25 percent more broods in the area than in 1957.

Conclusions

From all indications, the production has been considerably more favorable than last year, and with the 25 percent increase in the breeding population, at least 25-30 percent increase in production of all the major game species can be expected.

NORTHERN ALBERTA AND NORTHWEST TERRITORIES

Weather and Water Conditions

An unusually advanced and open spring prevailed throughout the survey area. Break-up was ten days to two weeks early on most of the smaller inland lakes, only the big, deep lakes showing ice during the period of the survey. Of the past eleven seasons this was by far the earliest phenologically.

Very little rain fell during the spring and the fire hazard was high. On the most southernly of the eleven strata surface water had disappeared from most of the temporary sloughs and low places, but north of 58° surface water was normal. In the northern area water levels may fluctuate up and down, but the area of surface water varies but little from year to year.

A contradiction to the general water pattern was the Athabasca delta-Lake Claire area, which suffered from too much water. This relatively small, high density area was flooded twice--once by the Athabasca river early in April and again by the Peace river early in May. When we crossed the delta again on June 16 most of it was still under water.

Breeding Population Indices

A study of tables 1 and 2 will reveal a general increase in most northern breeding ducks and also in some of the prairie ducks that normally occur in the north in only limited numbers. The outstanding advances numerically occurred in mallards and pintails--percentagewise shovellers, green-winged teals, goldeneyes, canvasbacks, blue-winged teals and ruddy ducks made some spectacular gains, although it should be noted that the latter three species occur in such limited numbers in the north as to be insignificant to the continental population. This applies to gadwall and red-heads as well.

<u>State & Area</u>	<u>Year</u>	<u>Scallop</u>	<u>Scooter</u>	<u>Pintail</u>	<u>Mallard</u>	<u>Baldpate</u>	<u>Shov.</u>	<u>C-w. Teal</u>	<u>C. Back</u>	<u>Goldeneye</u>
1.1 Alta & 76,894 Sq. Mi.	1958	278,200	69,900	199,200	367,900	77,500	45,600	33,400	50,200	194,600
	1957	140,300	25,400	100,200	213,500	90,200	15,400	7,700	10,800	30,800
1.2 Alta & B.C. 117,010 Sq. Mi.	1958	184,000	74,600	41,000	122,300	40,400	14,000	37,900	11,000	4,300
	1957	136,600	60,300	7,100	99,800	44,700	9,900	30,600	--	3,300
2. Lake Claire 1,625 Sq. Mi.	1958	10,100	200	17,500	37,800	5,800	3,300	1,200	11,900	11,900
	1957	10,100	1,200	25,400	32,700	10,700	6,100	2,700	4,700	7,400
3. N. W.T. 99,742 Sq. Mi.	1958	223,800	83,900	11,600	150,800	29,300	2,000	17,700	--	2,000
	1957	174,200	107,400	24,200	74,000	27,600	--	5,800	--	8,200
4. N. W.T. 77,146 Sq. Mi.	1958	127,500	106,100	21,400	15,900	4,700	--	--	--	--
	1957	197,300	159,800	23,000	28,800	10,100	--	1,400	--	--
5. Alta & NWT 12,100 Sq. Mi.	1958	50,500	--	88,000	123,100	40,700	81,500	53,400	--	2,800
	1957	30,900	1,400	29,500	17,500	33,600	10,700	14,800	--	--
6 N. W.T. 4,050 Sq. Mi.	1958	53,400	16,400	1,600	5,800	1,600	--	2,500	--	--
	1957	93,600	12,000	4,800	10,800	6,600	600	2,100	--	--
7. N. W.T. 62,240 Sq. Mi.	1958	307,800	289,800	33,800	8,600	15,700	--	3,100	--	16,500
	1957	272,400	395,100	40,900	14,700	24,500	--	4,100	--	2,500
8. N. W.T. 4,935 Sq. Mi.	1958	35,800	27,200	84,500	13,900	6,500	--	2,600	1,400	1,100
	1957	33,800	25,900	22,600	6,000	7,700	--	1,100	1,100	3,000
9. N. W.T. 8,655 Sq. Mi.	1958	38,500	52,600	9,600	600	2,600	--	600	--	--
	1957	17,900	45,300	9,600	600	2,600	--	--	--	--
10. Yukon	1958	24,200	31,300	15,600	1,000	3,600	700	500	6,400	2,300
1,970 Sq. Mi.	1957	13,200	25,600	15,000	--	3,200	--	100	1,900	2,100
TOTAL	1958	1,333,800	752,000	523,800	847,700	228,400	147,200	152,900	80,900	235,500
	1957	1,120,300	859,400	302,300	498,400	261,500	42,700	70,400	18,500	57,300
Percent Change from 1957		+ 19	- 12	+ 73	+ 70	+ 13	+ 240	+ 117	+ 337	+ 311

(1) Continued

<u>STRATA & AREA</u>	<u>Year</u>	<u>Bufflehead</u>	<u>Old Sq.</u>	<u>Merg.</u>	<u>R-Neck</u>	<u>Red Hd.</u>	<u>B-W Teal</u>	<u>Ruddy</u>	<u>Gadwall</u>	<u>Total Ducks</u>
1.1 Alta & B.C. 76,894 Sq.Mi.	1958	56,200	-	45,600	13,700	9,100	36,500	10,600	1,500	1,489,700
	1957	29,300	8,500	43,900	13,900	17,700	17,000	4,000	2,000	770,600
1.2 Alta & B.C. 117,010 Sq.Mi.	1958	47,700	-	4,300	22,600	-	6,100	1,200	-	611,500
	1957	44,700	10,800	4,700	17,000	-	-	1,400	-	470,900
2. Lake Claire 1,625 Sq.Mi.	1958	2,600	-	1,900	700	4,800	2,500	900	200	113,300
	1957	2,000	-	3,000	800	7,300	2,400	800	600	117,900
3. N.W.T. 99,742 Sq.Mi.	1958	10,200	43,000	3,400	-	-	-	-	-	577,700
	1957	12,100	34,800	15,500	-	-	-	-	-	483,800
4. N.W.T. 77,146 Sq.Mi.	1958	-	48,600	57,900	-	-	-	-	-	382,100
	1957	1,400	32,600	25,400	-	-	-	-	-	479,800
5. Alta & N.W.T. 12,100 Sq.Mi.	1958	9,400	-	-	12,600	-	6,100	-	-	468,100
	1957	-	-	-	2,700	-	-	-	-	141,100
6. N.W.T. 4,050 Sq.Mi.	1958	-	400	400	-	-	-	-	-	82,100
	1957	3,000	9,600	600	6,000	-	-	-	-	149,700
7. N.W.T. 62,240 Sq.Mi.	1958	-	94,200	15,700	-	-	-	-	-	785,200
	1957	-	53,200	10,600	-	-	-	-	-	818,000
8. N.W.T. 4,935 Sq.Mi.	1958	-	-	2,500	-	-	-	-	-	175,500
	1957	-	4,600	1,300	-	-	-	-	-	107,100
9. N.W.T. 8,655 Sq.Mi.	1958	-	17,300	6,400	-	-	-	-	-	128,200
	1957	-	23,000	-	-	-	-	-	-	99,000
10. Yukon 1,970 Sq.Mi.	1958	-	3,700	200	-	-	-	-	-	89,500
	1957	-	2,500	400	-	-	-	-	-	64,000
TOTAL	1958	126,100	207,300	138,300	49,600	13,900	51,200	12,700	1,700	4,902,900
	1957	92,500	179,600	105,400	40,400	25,000	19,400	6,200	2,600	3,701,900
Percent Change from 1957		+ 36	+ 15	+ 31	+ 23	- 44	+ 160	+ 100	- 33	+ 32

<u>STRATA & AREA</u>	<u>Year</u>	<u>Canada Goose</u>	<u>W. F. Goose</u>	<u>Swan</u>
1.1 Alta & B.C. 76,894 Sq.Mi.	1958 1957	5,400 3,800	-	-
1.2 Alta & B.C. 117,010 Sq.Mi.	1958 1957	17,600 1,400	-	-
2. Lake Claire 1,625 Sq.Mi.	1958 1957	- 50	-	-
3. N.W.T. 99,742 Sq.Mi.	1958 1957	16,600 7,200	-	-
4. N.W.T. 77,146 Sq.Mi.	1958 1957	11,400 5,000	-	1,500
5. Alta & N.W.T. 12,100 Sq.Mi.	1958 1957	-	-	-
6. N.W.T. 4,050 Sq.Mi.	1958 1957	-	-	-
7. N.W.T. 62,240 Sq.Mi.	1958 1957	1,300 2,550	-	8,100 2,700
8. N.W.T. 4,935 Sq.Mi.	1958 1957	100 300	800 -	300 2,200
9. N.W.T. 8,655 Sq.Mi.	1958 1957	- 700	- 7,800	4,500 4,800
10. Yukon 1,970 Sq.Mi.	1958 1957	-	-	400 200
TOTAL	1958 1957	52,400 21,000	800 7,800	13,300 11,400
Percent Change from 1957		/ 150	- 89	+ 17

Progress of Nesting

This year the lone drake factor was 60%, 8% higher than in 1957 which, according to prairie standards would indicate early nesting. However, in 1957, an exceptionally late season, it was 10% higher than the year before.

Conclusions

Except for the Athabasca Delta there is nothing foreseeable that would tend to restrict production. Consequently we believe that changes in production and fall flight will be comparable to the percent changes in the breeding populations.

BRITISH COLUMBIA

On the basis of a wire from R. H. Mackay, the situation in British Columbia is as follows:

"Weather and water conditions in British Columbia most favorable to waterfowl production to date. Season a week advanced over normal. Midsummer waterfowl counts remain high and show little change in species or numbers from last year. Successful hatch indicates good fall flight."

SOUTHERN ALBERTAWeather and Water Conditions

The yearly drying trend is continuing with long-time averages decreasing in all strata. Water indices for 1957 were the lowest on record and those of 1958 rank just above those of 1957. May water of 1958 show improvement in the prairies and a small decrease in the parklands. July water of 1958 gave the same relationships reflecting somewhat increased water in the prairie and small decrease for the parklands over 1957 figures. For the province as a whole, May water was down 21% from the long time average and 14% above the 1957 low. For July provincial figures were 29% below the long-time average and 5% above the 1957 low. The number of water areas in July had declined from the May count by 47% in Stratum A, 34% in Stratum B and 56% in Stratum C, and 41% for the province. Comparable figures for 1957 were declines of 36%, 34%, 48% and 37%. A decline of water is normal except in local areas where excessive seasonal rainfall occurs. With losses of this magnitude water was sufficient to accommodate the larger brood indices. Refer to Table I for a summary of this water data.

The number of water areas does not appear to be a critical factor. The waterfowl seasons of 1957 and 1958, the two fines for which we have records, yielded our lowest water indices. There is evidence that the rate at which the available water disappears may be more critical for nesting waterfowl than mere numbers of water areas.

SOUTHERN ALBERTA - Continued

Table I. Water Areas on Aerial Transects - Alberta

	Stratum A					Stratum B				
	May	Average	1957	1958	July	May	Average	1957	1958	July
Total Ponds Seen	2225	3036			1429	1622	3203	3118		2082 2043
Ponds Per Square Mile	815	11.56			5.43	6.16	16.9	16.50		11.01 10.81
Index	343404	186647	254720	230837	119893	136086	548400	442334	430596	355269 287524 282138
Percent Change		+ 36*			+ 13		- 3		- 2	
	- 26**				- 41		- 21		- 21	

	Stratum C					Province				
	May	Average	1957	1958	July	May	Average	1957	1958	July
Total Ponds Seen	433	638			224	281	5861	6792		3735 3946
Ponds Per Square Mile	5.06	7.46			2.62	3.29	11.1	12.63		6.94 7.34
Index	130027	81595	120225	79340	42411	52952	1021173	705992	805541	665434 449828 471176
Percent Change		+ 47*			+ 25		+ 14		- 5	
	- 7**				- 33		- 21		- 29	

* Percent change from previous year.

** Percent change from average.

SOUTHERN ALBERTA - Continued

Breeding Population Indices

Early season impressions have been confirmed and our provincial breeding pair index is at its highest level being 18% above the seven-year average and 14% above the 1957 index. This represents a significant increase with Strata B and C showing the greatest change. Nearly all species indices have raised. Only the pintail, green-winged teal and minor diving species have indices lower than average conditions (See Tables 2 through 5). All indices except for scaup and goldeneye are in excess of 1957 figures.

Table 2. Comparison of Aerial Waterfowl Population Indices - 1957-1958

	Strata A		Strata B		Strata C		Province	
	1957	1958	1957	1958	1957	1958	1957	1958
Total Area								
Square Miles	22088	22088	26100	26100	16112	16112	64300	64300
Sample Area								
Square Miles	526.5	526.5	378.0	378.0	171.0	171.0	1075.5	1075.5
Total Ducks								
in Sample	24416	26328	20032	22370	2638	4442	47086	53140
Total Ducks								
Square Mile	46.37	50.00	53.00	59.18	15.43	25.98	41.31	47.71
Index in								
Total Ducks	1024251	1104459	1383210	1544649	248553	418525	2656014	3067633
Percent								
Change	+ 8		+ 12		+ 68		+ 15	

Table 3. Comparison of Aerial Waterfowl Population Indices - 1958

	Strata A		Strata B		Strata C		Province	
	7 Year Average	1958	7 Year Average	1958	7 Year Average	1958	7 Year Average	1958
Index in								
Total Ducks	1088505	1104459	1125395	1544649	375549	418525	2589436	3067633
Percent								
Change	+ 1		+ 37		+ 11		+ 18	

Table 4. 1958 Breeding Population Indices Compared to 1957

	Stratum A		Stratum B		Stratum C		Province		Percent Change
	1957	1958	1957	1958	1957	1958	1957	1958	
Pintail	337732	332580	157710	169444	99635	153579	595177	651603	+ 9
Mallard	329811	363255	616341	652108	91770	158656	1037922	1194029	+ 15
Baldpate	58346	68798	87297	91008	10741	19221	156666	179027	+ 14
Shoveler	82306	97240	63526	94184	8857	25251	154689	216675	+ 40
Gadwall	22317	29952	32630	43363	2827	5842	60774	79157	+ 30
B-W Teal	49165	54283	83274	114623	1508	4899	133947	173865	+ 30
Cinn. Teal	-	336					-	336	-
G-W Teal	8977	8977	21958	244444	188	942	31123	34363	+ 10
Scaup	106805	97240	193202	174696	26758	36746	326765	308682	- 6
Canvasback	8474	8558	44054	78303	1508	7160	54036	94021	+ 74
Redhead	14347	16360	27344	42811	3392	3769	45083	62940	+ 40
Ruddy	1258	3104	11048	11739	-	754	12306	15597	+ 27
Bufflehead	1846	1846	15329	18644	-	942	17175	21432	+ 25
Goldeneye	755	419	2624	1933	1319	754	4698	3106	- 34
Ringneck	-	336	-	276	-	-	-	612	
Scoter	1762	1175	23891	31073	-	-	25653	32248	+ 26
Coots	7214	21017	33489	46263	3015	6972	43718	74252	+ 7

Table 5. 1958 Breeding Population Indices Compared to Seven-Year Average

	Stratum A		Stratum B		Stratum C		Province		Percent Change
	7 Year Average	1958							
Pintail	405565	332580	157957	165444	158959	153579	722480	651063	- 10
Mallard	314140	383255	486417	652108	122041	158666	922569	1194029	+ 29
Baldpate	69922	68798	71536	91008	22160	19221	163563	179027	+ 9
Shoveler	87937	97240	58436	94184	17910	25251	164282	216675	+ 32
Gadwall	24554	29952	31859	43363	4723	5842	61145	79157	+ 29
B-W Teal	53532	54283	80597	114623	4887	4899	139013	173805	+ 25
Cinn. Teal	100	336	-	-	309	-	406	336	- 17
G-W Teal	12011	8977	22086	24444	2701	942	36780	34363	- 7
Scaup	92730	97240	115106	174696	27980	36746	230672	308682	+ 34
Canvasback	10124	85558	42500	78303	4299	2160	55923	94021	+ 68
Redhead	15835	16360	29219	42811	7807	3769	52860	62940	+ 19
Ruddy	4542	3104	10099	11739	1081	754	15722	15597	- 1
Bufflehead	1856	1846	12608	18644	578	942	15043	21432	+ 42
Goldeneye	671	419	2112	1933	973	754	3923	3106	- 21
Ringneck	224	336	533	276	-	-	776	612	- 21
Scoter	1594	1175	31165	31073	188	-	32947	32248	- 2
Coots	33570	21017	46935	46263	12710	6972	93215	74252	- 20

SOUTHERN ALBERTA - Continued

A measure of the progress of the breeding season is estimated by the lone males present in the population. This is best characterized by the early breeders, mallards, pintails and canvasback. The data are presented in Table 6.

Table 6. Percent Lone Males in Early Nesting Species
(Pintail, Mallard and Canvasback)

<u>Year</u>	<u>Stratum A</u>	<u>Stratum B</u>	<u>Stratum C</u>	<u>Province</u>
1956	86%	87%	71%	84%
1957	90%	92%	89%	90%
1958	85%	87%	76%	85%
6-Yr. Average	80%	85%	72%	81%

SOUTHERN ALBERTA - Continued

Production Indices

Table 7 represents a summation of our aerial production data for 1958. Another banner year is indicated for Alberta. The indices for breeding birds exceeded all other years and our index for broods has done likewise. While the success of the hatch was reduced somewhat by early season drought in the prairies the phenomenal success of the hatch in the parklands more than offset this loss and gave an increase for the province as a whole.

Table 7. Aerial Production Data - 1957 - 1958

	Strata A		Strata B		Strata C		Province	
	1957	1958	1957	1958	1957	1958	1957	1958
Area								
Square Miles	22088	22088	26100	26100	16112	16112	64300	64300
Sample								
Square Miles	263.25	263.25	189.0	189.0	85.5	85.5	537.75	537.75
Total Broods								
Seen	1353	1218	1471	1925	111	48	2935	3191
Broods Per Square Mile	5.14	4.63	7.78	10.18	1.29	0.56	5.46	5.93
Est. No.								
Broods	113532	102267	203058	265698	20784	9023	337379	376988
Pot. Later								
Broods	126	154	66	46	24	47	216	247
Pot. Broods	0.48	0.58	0.35	0.24	0.28	0.55	0.40	0.46
No. Pot.								
Later Broods	10602	12811	9135	6264	4511	8862	24248	27937
Brood Index	124134	115078	212193	271962	25291	17885	361622	404925
Ind. Broods								
Per Sq. Mi.	5.62	5.21	8.13	10.42	1.55	1.11	5.62	6.30
Average								
Brood Size	6.21	6.02	6.34	6.48	5.70	5.31	6.25	6.30
Est. No.								
Young	770872	693920	1345304	1762314	144159	94969	2260335	2551203
Percent Change	- 10		+ 31		- 34		+ 13	

SOUTHERN ALBERTA - Continued

The brood index for the province is the highest recorded. Brood sizes average 6.04 somewhat higher than the average of 5.8 and lower than 6.25 of last year.

Evidence of potential later broods is low but not as low as 1957. It is higher in Strata A and C and lower in the parklands compared to 1957. This is evidence of a very successful hatch in the parklands and a minor disturbance to nesting waterfowl in the prairie--undoubtedly the drought conditions during May.

Although cost breeding populations are still below average, phenomenal increases were recorded in all strata this year over 1957. Provincial figures increased 70% in 1958 compared with 1957

Coot brood indices have been recorded for three years. The 1957 coot brood index was 74,700. This was an increase over 1956. In 1958 our index increased again and was 107,000. This index has almost doubled since 1956.

Conclusions

The aerial observation indices of breeding and production surveys for 1958 have recorded our highest indices. Breeding populations showed a gain of 15% over 1957 and 18% over our seven-year average. Our production is in excess of last year. We forecast a significant increase in the fall flight from Alberta approximating 15% over the 1957 fall flight.

WASHINGTONWeather and Water Conditions

The spring and summer was dry and warm in eastern Washington and caused a decrease of 32 percent in the number of potholes in this portion of the State.

Breeding Population and Production Indices

A decrease in duck production occurred in western Washington, the northeastern highland and the far eastern potholes. The irrigated portions of the State have shown a moderate increase in production, which was not sufficient, however, to offset the decline elsewhere.

The mallard has apparently been responsible for most of the decrease. This species is down 53 percent in far eastern Washington and 30 percent in western Washington. Diving ducks and the other species of dabblers have generally shown increases throughout the State. Coots are expected to be up about ten percent.

The waterfowl production index for the State is expected to be about 538,000 (see table). This includes young and adults at the end of the production season.

Comparison of Waterfowl Production of Previous Years
With That Anticipated for 1958

Region	1953	1954	1955	1956	1957	Est. 1958
Eastern Washington	364,500	377,500	366,500	468,500	492,200	458,000
Western Washington	38,000	35,000	25,300	64,900	87,600	80,000
TOTAL	402,500	412,500	391,800	533,400	579,800	538,000

Conclusions

Based mainly upon the first census of waterfowl transects, production in Washington is expected to be down about 7 percent from last year on ducks, with little or no increase in Canada geese.

IDAHO

Weather and Water Conditions

The spring run-off was quite gradual and flooding was not a serious problem in any area of the State. Most reservoirs filled and still contain adequate water for brood purposes. There were no weather disturbances of a large enough scale to seriously affect waterfowl production in the State.

Breeding Population Indices

An aerial count was taken in the major goose nesting areas of the State for the fourth consecutive year. The results as given in Table 1 indicate an 18% increase in total geese from last year and a 34% increase from the average of the three previous years. The major area of increase was eastern Idaho where the Gray's Lake-Blackfoot Reservoir-Dingle Marsh complex increased 26% from last year and 55% from the average of the three previous years. Since a significant portion of this increase was in the "pairs" category, the aerial count figures are encouraging.

Production Indices

Goose Nesting. Canada goose nesting studies were continued in several areas of the State. The results, as shown in Table 2, do not indicate total estimated production. They show population trends based on the number of and hatching success of nests found on the same areas covered in the same manner each year. On this basis, the estimated production on four areas with trend information for seven years is 11% below last year and 2% below the average for the previous six years. The estimated production on six areas with trend data for five years is 8% below last year and 2% below the average for the previous four years. The reduction was due entirely to a 29% drop from the previous year on estimated production on the Homedale unit. For all practical purposes these birds are non-migratory. The eastern Idaho units all showed an increase. Collectively, it amounted to 19% over last year.

Ducks. Duck brood production routes were counted in three areas of the State. The routes were run twice with all classes of broods counted on the first run and only Class I broods counted on the second run. The results are shown in Tables 3 and 4. The south-central Idaho counts were up 47% from last year. The Camas National Wildlife Refuge counts were down 59% from 1956 (no count in 1957) and 14% from the previous four-year average. The Blackfoot Reservoir count was up 58% above 1956 (no count in 1957) and 67% above the previous four-year average.

Brood counts on over 300 broods of all classes indicate average survival to Class III size.

TABLE 1

Idaho Canada Goose Aerial Count - 1955-1958

Area	1955	1956	1957	1958	1955	1956	1957	1958	1955	1956	1957	1958
<u>Snake River Drainage</u>												
Farewell Bend to Railroad Bridge	460	352	459	474	248	77	278	236	1168	781	1196	1184
Payette River (mouth to Emmett)	110	109	120	88	41	21	101	169	261	239	341	345
Strike Dam to American Falls Dam	95	56	48	92	77	97	34	61	267	209	130	245
North Fork, including Island Park	24	37	66	106	173	143	148	136	221	217	280	348
South Fork	48	46	36	59	36	9	44	25	132	101	116	143
Mud Lake-Camas NWR Area	96	108	82	108	28	19	49	69	220	235	213	285
Gray's Lake Area	124	106	145	176	43	70	156	74	291	282	446	426
Blackfoot Reservoir Area	54	83	113	217	198	280	185	73	306	446	411	507
<u>Bear River Drainage</u>												
Dingle Marsh Area	<u>171</u>	<u>140</u>	<u>269</u>	<u>447</u>	<u>132</u>	<u>197</u>	<u>176</u>	<u>160</u>	<u>474</u>	<u>477</u>	<u>714</u>	<u>1,054</u>
Totals	1,182	1,037	1,338	1,767	976	913	1,171	1,003	3,340	2,987	3,847	4,537

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TABLE 2

Comparison of Goose Production on Idaho Study Areas - 1952-1958

	Glenns Ferry	Homedale	Blackfoot Reservoir	Island Park Reservoir	North Fork Snake River	North Lake	Total*
No. nests found							
1952	24	208	103	16	-	-	351
1953	24	250	121	44	-	-	439
1954	34	216	132	42	39	24	424 (487)*
1955	16	189	117	34	32	31	356 (419)*
1956	15	214	86	38	32	40	353 (425)*
1957	13	253	99	32	35	32	397 (464)*
1958	8	208	89	51	40	31	356 (427)*
No. nests hatched							
1952	16	103	75	12	-	-	206
1953	11	180	74	36	-	-	301
1954	9	169	78	36	34	19	292 (345)*
1955	1	125	81	19	21	26	226 (273)*
1956	6	123	61	34	31	34	224 (289)*
1957	8	194	50	23	25	25	275 (325)*
1958	7	151	59	28	35	28	245 (308)*
Average hatch							
1952	5.1	4.7	4.7	4.0	-	-	4.7
1953	5.4	5.0	4.8	4.6	-	-	4.9
1954	4.6	5.5	4.5	4.1	4.8	4.4	5.0 (5.0)*
1955	4.0	4.8	4.8	2.7	4.5	5.2	4.6 (4.6)*
1956	6.0	5.1	5.3	5.4	4.9	5.1	5.2 (5.2)*
1957	5.1	5.3	4.0	4.1	5.5	4.7	5.0 (5.0)*
1958	6.3	5.3	4.5	4.3	4.1	4.3	5.0 (4.9)*

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Continued --

Continued --

	Glenns Ferry	Homedale	Blackfoot Reservoir	Island Reservoir	Park Snake River	North Fork North Lake	Total*
Estimated production							
1952	82	484	352	48	-	-	966
1953	60	900	355	166	-	-	1,481
1954	41	930	351	148	154	80	1,470 (1,704)*
1955	4	601	387	52	94	130	1,044 (1,268)*
1956	36	627	323	185	152	173	1,171 (1,496)*
1957	41	1,030	201	95	136	118	1,367 (1,621)*
1958	44	798	267	121	145	121	1,230 (1,496)*

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* Excluding North Fork and North Lake
()* Including North Fork and North Lake

Continued --

TABLE 3

Southcentral Idaho Duck Production Trend Routes
1957-58

Trend Route	Year	Mallard	Redhead	Gadwall	B-W/Cinn.	Teal	Baldpate	Ruddy	Total
Milner Canal	1957	15	-	-	1	-	-	-	16
	1958	23	3	-	1	-	-	-	27
Minidoka Burley	1957	7	5	6	0	-	-	-	18
	1958	1	21	9	3	-	-	2	36
Richfield Canal	1957	9	-	-	-	-	2	-	11
	1958	2	-	-	-	-	6	-	8
Bypass Canal	1957	9	-	2	-	-	3	-	14
	1958	9	-	-	-	-	7	-	16
Dietrich Canal	1958	6	-	-	-	-	5	-	11
Total of Comparable Routes									1957 59 1958 87

Continued --

TABLE 4

Southeastern Idaho Duck Production Trend Routes
1953-58*

Trend Route	Year	Number Broods By Species												Total
		Mallard	Pintail	Baldpate	Gadwall	Shoveler	G-W Teal	B-W/Cinn. Teal	Canvasback	Redhead	Ruddy	Scaup, Lesser	Unidentified	
Camas NWR	1953	9	4	1	7	1	1	1	17	9	4	9	9	63
	1954	22	4	-	9	2	1	2	4	3	8	5	10	64
	1955	6	2	-	7	1	1	1	3	6	6	9	30	38
	1956	19	4	3	5	1	1	1	14	4	4	6	30	89
	1958	14	3	1	5	2	1	3	10	1	1	7	8	56
Blackfoot Res.	1953	14	6	4	28	-	1	-	-	-	-	12	13	78
	1954	14	4	4	33	-	1	5	-	-	-	8	4	78
	1955	12	2	6	23	-	1	7	-	3	-	6	5	65
	1956	8	-	11	41	-	-	3	-	-	-	12	4	79
	1958	28	8	10	54	-	1	2	-	1	-	8	13	125

* No routes were censused in 1957.

IDAHO - Continued

Conclusions

It is estimated that the statewide goose production will be 8% lower than last year with a 19% increase noted in eastern Idaho. The duck flight will be slightly higher than last year.

CALIFORNIAWeather and Water Conditions

Precipitation in northeastern California was above normal for the third year and these conditions resulted in an abundance of water available during the nesting season. The water level in many reservoirs and lakes in this section was higher than ever recorded. Nesting conditions were considered to be excellent.

Late spring rains occurred throughout California and some sections including the central part received as much as twice the normal rainfall for the year. There was some flooding of rivers and streams draining into the Sacramento Valley and in the San Joaquin Valley the flooding was more extensive. The San Joaquin River flooded in several areas and water from the Kings, Tule, and Kaweah Rivers overflowed into Tulare and Hacienda Lakes. Buena Vista Lake was also partially filled. Excellent stands of barley adjacent to these flooded areas furnished good nesting cover. More water remained in the Grasslands than usual making nesting conditions quite favorable there.

Breeding Population and Production Indices

A comparative summary of nesting pairs of waterfowl for the past four seasons, together with final fall population including young plus resident adults, is shown in the following table. In almost all cases the figures shown for "nesting pairs" are more accurate than those indicating "fall population indices."

Species	Estimated Total Nesting Pairs				Fall Population Indices			
	1955	1956	1957	1958	1955	1956	1957	1958
Canada Goose	2,870	3,130	3,960	4,360	14,810	17,640	19,280	25,190
Mallard	34,500	29,410	37,470	31,250	165,360	136,970	150,540	146,470
Pintail	1,260	1,850	2,220	6,850	7,710	11,530	12,860	31,030
Gadwall	3,150	2,710	2,880	2,970	24,500	21,020	22,370	22,570
Cinnamon Teal	4,560	4,760	1,720	2,220	30,670	33,710	9,410	10,670
Redhead	4,220	4,430	2,980	2,670	35,810	37,790	24,480	20,900
Ruddy Duck	2,990	2,230	1,640	2,170	19,540	15,610	10,160	12,750
Shoveler	530	630	650	2,150	3,300	4,240	4,250	12,120
Scaup	180	340	550	710	1,480	2,590	4,440	5,730
Others	190	350	400	450	850	1,520	1,950	2,740
TOTAL	51,580	46,710	50,510	51,440	289,120	264,980	240,460	264,980
Coots	12,060	12,870	12,350	23,460	43,480	81,340	74,890	127,760

CALIFORNIA - Continued

Conclusions

- (1) A 10 percent increase in nesting pairs of Canada geese and a 31 percent increase in total fall population indices. Apparently large numbers of non-breeding geese remained in the state during the moult.
- (2) An overall increase of 2 percent in breeding pairs of ducks and an increase of 10 percent in the total fall population. Pintail showed a significant increase this year throughout the state except in the Klamath Basin. Shoveler also indicated an increase throughout the state. Cinnamon teal, redheads and ruddy ducks were present in fewer numbers than normal for the second year.
- (3) An increase of 90 percent in the nesting coot population and an increase of 71 percent in total fall population indices. Ideal water conditions in the San Joaquin Valley resulted in a large build up of the nesting coot population.

NEVADAWeather and Water Conditions

Weather conditions have been favorable to waterfowl production throughout the late spring and early summer nesting period. Severe storms during March and early April increased the mountain snow pack. The water supply forecast as of April 1, 1958, indicated that this year will be the best irrigation water year since the record-breaking year of 1952. Most reservoirs were lowered in anticipation of high expected flows.

Stream flows varied from 125 percent to 177 percent of normal. All major waterfowl producing reservoirs were at or near capacity storage during the peak of the nesting season.

Breeding Population Indices

Ducks: Breeding pair counts taken at the Stillwater Wildlife Management Area show an increase of 14.7 percent over last year. There were 4,768 estimated breeding pairs using the area this year compared to 4,157 pairs in 1957. Significant increases were noticed in mallards, gadwalls, pintails and cinnamon teal. Other nesting species showed no significant change. This key area is used as an index for production trends in west-central Nevada. Species abundance presented in the following table remains fairly constant from year to year:

Species Composition of Breeding Pairs
Stillwater Wildlife Management Area

Species	Pairs	Percent Abundance
Redhead	1,796	37.5
Cinnamon Teal	1,479	31.0
Gadwall	635	13.3
Mallard	421	8.7
Pintail	206	4.3
Ruddy	184	3.7
Shoveler	35	.7
Baldpate	8	.1
Green-winged Teal	4	-
 TOTAL	 4,768	

NEVADA - Continued

Production Indices

Brood surveys to determine production trends of ducks on the reservoirs of northern Nevada indicate an increase in production of about 40 percent. Good water conditions during the past two seasons have benefited production considerably in this area and good recovery is being made following the setback caused by drought during 1954, 1955 and 1956. Average size of all broods classified to date is 6.5. The average brood size last year was 6.8 birds.

Geese: Production of Canada geese in Nevada showed very little change from last year with the exception of a slight increase in the northern portion of the State. Ruby Lake National Wildlife Refuge reported a slight increase in goose production this year. Total production of Canada geese is estimated at 1,500 birds. The moulting population of Canada geese at Pyramid Lake was up 29 percent over last year. The 3,500 moulting geese at Pyramid Lake this year is the highest figure on record.

Conclusions

Breeding pair counts and early brood surveys indicate an increase in duck production of about 35 percent for the entire State. Production of Canada geese was somewhat higher than normal with total production estimated at 1,500 birds.

UTAH

On the basis of a wire from Donald A. Smith, Utah State Department of Fish and Game, the waterfowl situation in state is as follows:

The 1958 breeding ground survey in Utah was confined to a breeding pair count of ducks and a brood count of geese. Both aerial and ground counts show increase in breeding pairs of ducks. The greatest increase noted was in pintails. There was an increase in Canada goose broods observed on nearly all areas other than Bear River Refuge. There were 90 less broods counted on this area as compared to last year which affected the state total to the extent that total goose production was down 181 young as compared to 1957. Weather and water conditions have been excellent. There is an apparent increase in duck broods from 1957 but no actual count has been made.

Conclusion:

There will be an increase in ducks in Utah as compared to last year but the number of geese will remain about the same or decrease slightly.

OREGON

Weather and Water Conditions

Eastern Oregon, which contains the major waterfowl breeding grounds in the state, had ideal water conditions for waterfowl production. Heavy rains during May and June, however, were damaging to newly hatched birds.

Production Indices

Results obtained from breeding ground surveys are presented in the accompanying tables and show a five per cent increase in goose production and a 46 per cent decrease in duck production. The number of Canada geese produced on the samples is slightly above the average for the past seven years.

Duck production, according to the limited sampling, is down an indicated 46 per cent from a peak production season in 1957. Biggest decrease was registered with redheads.

An abundance of water along with a luxuriant growth of emergent vegetation created more habitat and made observations of broods difficult. These factors along with sampling 10 days earlier than in 1957, undoubtedly resulted in the reduced tally, especially with the late nesting redhead. Field biologists feel there is a decrease in duck production in Oregon but not as great as indicated in their sampling.

Conclusions

There will be a small decrease in the number of ducks produced in Oregon as compared to 1957 but the number of Canada geese will remain about the same.

WATERFOWL PRODUCTION (OREGON)

Species	Klamath Basin (37.0 Sq. Miles)				Summer Lake (1.0 Sq. Miles)				Silver Lake (1.0 Sq. Mile)			
	No. Broods 1957	1958	No. Young 1957	1958	No. Broods 1957	1958	No. Young 1957	1958	No. Broods 1957	1958	No. Young 1957	1958
Mallard	101	85	540	421	11	13	76	104	21	7	148	51
Pintail	2	-	9	-	5	6	36	51	4	2	20	18
Gadwall	10	17	53	103	10	17	84	136	13	4	97	34
BW/Cinn Teal	35	25	189	150	2	6	18	53	7	2	57	30
Shoveller	-	-	-	-	1	-	6	-	-	1	-	7
Redhead	687	253	4,437	1,414	14	26	107	184	5	3	40	22
Canvasback	3	-	13	-	-	-	-	-	-	-	-	-
Scaup	11	4	66	24	-	-	-	-	-	-	-	-
Ruddy	99	97	580	600	-	4	-	25	-	2	-	13
Wood Duck	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified and other	-	6	-	36	-	-	-	-	-	-	-	-
TOTAL DUCKS	948	487	5,887	2,748	43	72	327	553	50	21	36	175
Canada Goose	233	244	1,065	1,182	79	74	337	343	71	58	306	248

WATERFOWL PRODUCTION (OREGON)

Species	Paulina Marsh (0.75 Sq. Mile)				Abert Lake (3.4 Sq. Miles)				Umatilla County (4.0 Sq. Miles)			
	No. Broods 1957		No. Young 1948		No. Broods 1957		No. Young 1958		No. Broods 1957		No. Young 1958	
Mallard	10	2	86	16	13	11	101	83	19	2	96	13
Pintail	2	4	13	33	2	3	15	23	5	3	26	12
Gadwall	2	2	16	17	7	5	50	44	2	1	3	7
♂ BW/Cinn Teal	3	1	17	12	1	1	6	10	4	3	24	14
Shoveller	-	-	-	-	-	-	-	-	-	-	-	-
Redhead	2	1	17	7	6	4	27	26	1	-	4	-
Canvasback	-	-	-	-	-	-	-	-	-	-	-	-
Scaup	-	1	-	5	-	-	-	-	-	-	-	-
Ruddy	-	-	-	-	1	3	5	19	-	-	-	-
Wood Duck	-	-	-	-	-	-	-	-	1	-	1	-
Unidentified and other	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL DUCKS	19	11	149	90	30	27	204	205	32	9	154	46
Canada Goose	-	6	-	27	18	26	74	114	8	-	28	-

TOTAL PRODUCTION (OREGON)
(47.15 Sq. Miles)

Species	No. Broods		No. Young	
	1957	1958	1957	1958
Mallard	175	120	1,047	688
Pintail	20	18	119	137
Gadwall	44	46	303	341
BW/Cinn Teal	52	38	311	269
Shoveller	1	1	6	7
Redhead	715	287	4,632	1,653
Canvasback	3	-	13	-
Scaup	11	5	66	29
Ruddy	100	106	585	657
Wood Duck	1	-	1	-
Unidentified and other	-	6	-	36
TOTAL DUCKS	1,122	627	7,083	3,817 -46%
Canada Geese	409	408	1,816	1,914 + 5%

Central Flyway Data

Waterfowl Kill Information

The following table presents the estimated number of waterfowl bagged and waterfowl knocked down but not retried during the 1956-57 and 1957-58 shooting seasons as determined by the Waterfowl Hunter Mail Survey:

Species	1957-1958	1956-1957	Percent Change 1956-1957 to 1957-1958	
			/	-
Mallard	1,724,199	1,480,764	/	16.43
G-W. Teal	651,708	405,228	/	60.83
Pintail	434,343	353,088	/	23.01
B-W. Teal	338,252	298,295	/	13.40
Redhead	180,556	170,934	/	5.63
Canvasback	144,135	144,368	-	.16
Shoveler	125,149	90,406	/	38.43
Gadwall	64,318	89,031	-	27.76
Am. Wigeon	50,757	39,033	/	30.04
Scaup	92,990	34,078	/	172.87
Ruddy	5,036	22,474	-	77.59
Cinn. Teal	11,623	18,414	-	37.04
Bufflehead	5,036	12,979	-	61.20
Wood Duck	13,173	10,869	/	21.20
Ring-necked	21,697	10,294	/	110.77
Merganser	4,649	7,576	-	38.64
Goldeneye	3,099	4,827	-	35.80
Black Duck	2,324	2,462	-	5.61
Scoter	1,549	543	/	185.27
Others	00	1,151	--	--
Total Ducks Retrieved	3,874,604	3,196,814	/	21.20
Total Ducks not retrieved	681,092	520,847	/	30.77
Total Duck Kill	4,555,696	3,717,661	/	22.54
Canada Goose*	192,432	168,998	/	13.87
Snow Goose	61,458	113,166	-	45.69
Blue Goose	23,965	25,575	-	6.30
White-fronted Goose	19,475	32,763	-	40.56
Total Geese Retrieved	297,330	340,502	-	12.68
Total Geese not retrieved	32,970	65,402	-	49.59
Total Goose Kill	330,300	405,904	-	18.63
Total Coot Retrieved	79,439	72,168	/	10.08
Total Coot not retrieved	25,633	21,580	/	18.78
Total Coot Kill	105,072	93,748	/	12.08

* Includes all white-cheeked geese as Canada geese.

Central Flyway Data

Number of Hunters, Average Times Hunted, Seasonal Bag, Seasonal Unretrieved Kill
and Daily Bag as Determined by the Waterfowl Hunter Mail Survey

	1957-1958	1956-1957	Percent Change 1956-1957 to 1957-1958
Number of Potential Hunters			
Over 15*	554,470	489,434	+ 13.29
Under 16	52,384	51,508	N.C.
	<hr/>	<hr/>	<hr/>
	606,854	540,942	+ 12.18
Number of Active Hunters**			
Over 15	479,916	418,535	+ 14.43
Under 16	41,732	38,628	+ 8.04
	<hr/>	<hr/>	<hr/>
	521,648	457,163	+ 14.11
Average Times Hunted**			
	3.933	4.874	- 19.31
Average Seasonal Bag**			
<u>Over 15</u>	Ducks 7.839	7.183	+ 9.13
	Geese .533	.791	- 32.62
	Coot .133	.147	- 9.52
<u>Under 16</u>	Ducks 2.695	4.924	- 43.24
	Geese .093	.244	- 61.89
	Coot .371	.276	+ 34.42
Average Seasonal No. not retrieved**			
<u>Over 15</u>	Ducks 1.379	1.159	+ 18.98
	Geese .067	.151	- 55.63
	Coot .049	.045	+ 8.89
<u>Under 16</u>	Ducks .465	.925	- 49.73
	Geese .021	.056	- 62.50
	Coot .056	.069	- 18.84
Average Daily Bag**			
<u>Over 15</u>	Ducks 1.993	1.474	+ 35.21
	Geese .136	.162	- 16.05
	Coot .034	.030	+ 13.33
<u>Under 16</u>	Ducks .685	1.010	- 32.18
	Geese .024	.050	- 52.00
	Coot .094	.057	+ 64.91

* Individuals who purchased a Duck Stamp with intent to hunt.

** Individuals who hunted at least once. 49

Winter Trend Data - Central Flyway

As mentioned previously, it was not possible for the Bureau of Sport Fisheries and Wildlife to conduct the annual survey of waterfowl wintering ground in Mexico during January 1957. Inasmuch as the East Coast and central portions of Mexico usually contain from 20 to 60 percent of the total waterfowl recorded in the Central Flyway during the winter survey there is question as to whether data recorded in the Central Flyway States only are representative of trends in wintering population. This is particularly true in view of the fact that there was a recorded decrease of about $3\frac{1}{2}$ million birds in Texas between 1956 and 1957, while between 1957 and 1958 there was an increase of about 2 million. The species involved in the change are ones regularly found wintering in Mexico and circumstantial evidence points to the possibility that there may have been a decided shift to Mexico wintering areas during 1957.

On the basis of data collected in the United States only, ducks increased 96 percent as compared to 1957, geese increased 27 percent, coot increased 248 percent, and waterfowl collectively increased 91 percent. On the same basis the species composition and percent change for individual species is presented in the following table. The following graph presents the trend in duck, goose, and coot populations for the period 1949 through 1958. The data have been adjusted so that year to year comparisons are on the basis of comparable coverage. In making the compilation it was assumed that the areas covered were representative of any change which may have occurred. This assumption is subject to the possible error outlined above particularly between 1956 and 1957 and between 1957 and 1958.

Species Composition - Central Flyway - 1957 and 1958
(Comparable Coverage)

Species	Percent of Birds Identified		Percent Change
	1957	1958	
Mallard	62.0	60.1	+ 84.6
Pintail	9.3	8.1	+ 64.8
Snow Goose	6.9	3.7	+ 1.4
Redhead	6.1	5.7	+ 78.6
Canada Goose	3.5	3.0	+ 63.1
Scaup	2.3	7.8	+ 545.9
Baldpate	2.0	2.3	+ 123.8
Coot	1.8	3.5	+ 274.7
Green-winged Teal	1.4	2.4	+ 220.9
Merganser	1.3	.9	+ 27.1

Continued --

Species Composition - Central Flyway - Continued

Species	Percent of Birds Identified		Percent Change
	1957	1958	
Gadwall	.9	.7	+ 41.3
Blue Goose	.8	.7	+ 60.4
White-fronted Goose	.4	.4	+ 80.2
Shoveler	.4	.2	+ 23.8
Goldeneye	.4	.3	+ 40.1
Canvasback	.2	.1	+ 18.7
Ringneck	.1	.1	-
Blue-winged Teal	.1	Tr.	-
Ruddy	.1	Tr.	-
Bufflehead	Tr.	Tr.	-
Wood Duck	Tr.	Tr.	-
Mottled	Tr.	Tr.	-
Trumpeter Swan	Tr.	Tr.	+ 144.1
Whistling Swan	Tr.	Tr.	-
TOTAL	100.0	100.0	+ 90.9

Trend in Duck, Goose, and Coot Population in Central Flyway
1949 Through 1958 (Comparable Coverage)

Percent Departure From Average

Plus

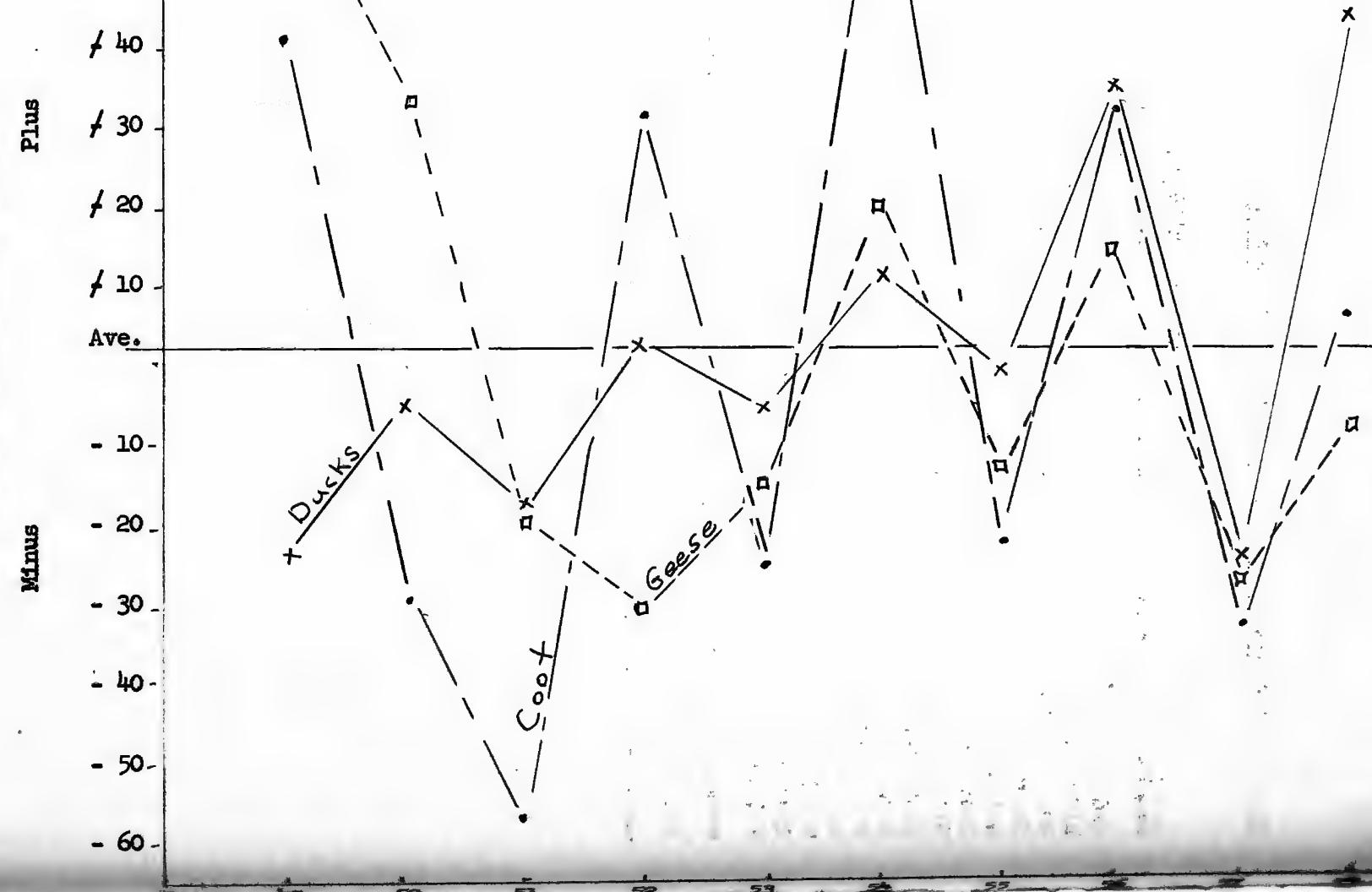
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-30
-40
-50
-60

Minus

Ducks

Geese

Coot



SOUTHERN SASKATCHEWANWeather and Water Conditions

We faced a habitat in Southern Saskatchewan this spring that was generally dry. The past winter had practically no snow. Carry-over fall moisture was sufficient for starting agriculture crops but the pond index for May 1958 was down almost 30% from the average of 1949 to 1953. Our figures show a slight increase in ponds over last year. This may be due to the change in observers or the local increases in ponds in a few isolated areas. All indications point toward a decline pond condition.

May was exceptionally dry with practically no rain throughout the southern portion of the province. A few showers did nothing for the pothole situation. In addition May was unusually warm and windy. The worst dust storms in years were noted on May 12 and 13 and again on May 17. This all added to losses in ponds.

The prolonged and increasing drouth continued through the summer months with adverse effects on waterfowl production as well as farm crops. Practically no rain fell during these months, except for occasional showers which had practically no beneficial effect for nesting waterfowl. The first general rain occurred on July 12th and 13th and left in its wake as much as four inches of moisture in a few localities. Except for the extreme southern portion of the province the results indicated $\frac{1}{2}$ to $1\frac{1}{2}$ inches of moisture.

The overall picture showed a decrease in July ponds of 39% from last year. Last year the pond index stood at 1,254,000 while this year it was at 764,900. As mentioned this was the lowest in the past seven years of which we have data for.

All strata were down from last year, the largest decline being in A-West, A-East and B-East. B-West and C showed little decline from last year. Local rain in those areas appeared to have changed the situation little from last year, when they were considered to be quite dry then. It now appears that only the deeper and more permanent type ponds will hold up for the remainder of the season.

Breeding Population Indices

The breeding population index came out to 5,193,900 for all ducks. This compares very favorably with last year. It was off about 2% which is not measurable. Actually the total number of ducks was exceeded only by the years 1955 and 1956 in the past five years.

Of particular interest was the large increase in mallards. Mallards showed a 39% increase over 1957 and the highest population ever recorded on our transect surveys. On the other hand the pintail population was off 33% from last year and down 15% from the 1949 to 1953 average. Baldpates showed a substantial increase over last year. Of the other species, and particularly divers, generally they indicated substantial decreases from last year. Table III gives a run-down on gains and losses.

May 1958 Waterfowl Population Summary - Southern Saskatchewan

	STRATA					Province Totals
	A-East	A-West	B-East	B-West	C	
Area in Sq. Miles	14,600	37,630	33,720	16,800	16,800	114,040
Sample in Sq. Miles	317.0	622.0	173.0	165.0	127.0	1404.0
Ducks Actually Seen						
Lone Drakes	4,642	2,584	1,678	1,039	424	10,367
Pairs	2,584	1,257	577	382	197	4,997
Flocks	1,786	157	48	66	0	2,057
Unidentified	7,134	7,383	3,023	2,354	1,115	21,009
Percent Lone Males	77.5	74.8	82.95	83.21	76.79	79.5
Identified Ducks Seen	11,596	5,255	2,880	1,869	818	22,418
Ducks Per Square Mile	87.1	30.6	54.3	40.3	23.1	45.6
Stratum Population						
Indices	1,270,900	1,152,200	1,832,200	677,700	260,900	5,193,900
Coots Per Sq. Mile	0.95	0.22	1.2	0.57	0.31	0.65
Coots Stratum Total	13,900	8,200	38,800	9,500	3,500	73,900
Ponds Per Sq. Mile	36.1	9.3	14.5	11.4	9.3	14.6
Ponds Stratum Total	526,500	350,500	489,600	191,000	105,100	1,662,700
Expansion Factor	46.06	60.5	194.91	101.82	88.9	81.23
Linear Miles in Sample	1,268	2,488	692	660	508	5,616

Species Indices (Aerial) - May, 1958 Waterfowl Population, Southern Saskatchewan

Species	STRATA					Province Totals
	A-East	A-West	B-East	B-West	C	
Pintail	120,700	258,100	245,500	73,900	91,100	789,300
Mallard	786,700	678,600	1,189,100	384,900	125,800	3,165,100
Baldpate	85,200	50,700	88,000	42,700	9,100	275,700
Shoveler	24,100	54,100	95,300	23,000	16,700	213,200
Gadwall	5,100	13,800	22,000	8,800	4,200	53,900
Blue-winged Teal	133,400	19,600	34,800	12,200	7,000	207,000
Green-winged Teal	7,600	1,200	7,300	7,500	500	24,100
Cinnamon Teal	-	-	-	-	500	500
Subtotal Surface Ducks	1,162,800	1,076,100	1,682,000	553,000	254,900	4,728,800
Scaup	45,800	41,500	69,700	51,500	5,500	214,000
Canvasback	48,300	25,300	42,200	41,300	500	157,600
Redhead	11,400	6,900	23,800	16,900	-	59,000
Ruddy	-	1,200	7,300	4,100	-	12,600
Ringneck	1,300	1,200	1,800	1,400	-	5,700
Goldeneye	-	-	1,800	3,400	-	5,200
Bufflehead	1,300	-	1,800	2,700	-	5,800
Scoter	-	Trace	1,800	3,400	-	5,200
Subtotal Divers	108,100	76,100	150,200	124,700	6,000	465,100
GRAND TOTAL DUCKS	1,270,900	1,152,200	1,832,200	677,700	260,900	5,193,900
Coots	13,900	8,200	38,800	9,500	3,500	73,900
Ponds	526,500	350,500	489,600	191,000	105,100	1,662,700

Comparative Indices - May Waterfowl Population - Southern Saskatchewan
 (From Air Surveys)

	1949-1953	1954	1955	1956	1957	1958
Pintail	923,900	1,275,000	1,774,100	1,969,500	1,185,300	789,300
Mallard	1,186,400	1,912,100	2,032,600	2,473,200	2,273,700	3,165,100
Baldpate	183,100	182,100	235,800	301,100	204,200	275,700
Shoveler	200,600	288,400	351,500	389,800	308,800	213,200
Gadwall	79,100	85,400	108,800	111,100	125,000	53,900
Blue-winged Teal	161,700	263,900	375,500	384,600	309,700	207,000
Green-winged Teal	22,400	18,700	52,500	61,800	33,300	24,100
Black Duck	Trace	-	Trace	-	1,500	-
Cinnamon Teal	-	-	-	-	-	500
Subtotal Surface Ducks	2,757,200	4,025,600	4,930,800	5,691,100	4,441,500	4,728,800
Scaup	146,200	209,600	459,700	551,600	455,000	214,000
Canvasback	123,200	166,600	177,600	223,300	214,900	157,600
Redhead	38,300	73,400	85,400	153,300	112,400	59,000
Ringneck	8,600	5,600	19,800	9,200	4,600	5,700
Ruddy	21,500	15,000	47,700	46,700	34,300	12,600
Goldeneye	8,700	7,600	4,800	15,800	7,900	5,200
Bufflehead	10,700	4,600	8,900	7,100	15,600	5,800
Scoter	46,000	75,500	9,400	16,000	900	5,200
Merganser	Trace	-	-	-	-	-
Subtotal Divers	403,200	557,900	813,300	1,023,000	845,600	465,100
GRAND TOTAL DUCKS	3,160,400	4,583,500	5,744,100	6,714,100	5,287,100	5,193,900
Coots	87,500	140,200	201,500	306,500	241,900	73,900
Ponds	2,325,900	4,264,400	4,033,200	2,488,900	1,444,900	1,662,700

SOUTHERN SASKATCHEWAN - Continued

Production Indices

The 1958 brood index was 253,100 as compared to 615,800 in 1957 (- 59%). Stratum A-West was down 76%, the largest drop, while A-East showed the least lost, only 18%.

Numbers of ducklings per brood was also down, in fact at an all time low of 4.3 ducklings per class III brood. Taking class II and III broods together the figure indicated 4.16 ducklings per brood, also an unusually low number.

The coot brood index was off 92% by our aerial methods. Coot population and production figures have always left much to be desired from aerial surveys. However, to the best of our knowledge coot production will be down in this area, although it may not be off as much as the figures indicate.

The early nesters as indicated reached a hatching peak in late May. However, re-nesting attempts appear to have continued and at present a number of broods are still coming off. Of the broods observed and classified this year they fell into this category: Class I's 33.6%; Class II's 44.0%; and Class III's 22.4%. Last year this breakdown showed broods to be thus: Class I's 25.2%; Class II's 32.1%; and Class III's 42.5%. This would indicate for this year a fairly poor success of early nesters and better success on re-nesting and later nesting species. The late nexting index in 1958 stood at 264% above 1957. This index was stronger than any previous year in the last seven years except 1955. It is doubted that the index this year of 388,500 should be considered a balancing effect to brood losses. It no doubt will assist in offsetting some previous losses. However, it should be remembered that with the declining water conditions these late nesters and re-nesters are up against the same perils as confronted the early nesters and their success will probably be no better.

Comparative Data - July 1958 - Aerial Surveys - Southern Saskatchewan

	1957	1958	% Change
Broods Per Square Mile	5.4	2.22	- 58.9
Brood Index	615,839	253,135	- 58.9
PLB Per Square Mile	0.95	3.47	264.3
Late Nesting Index	108,562	395,500	264.3
Pond Per Square Mile	10.99	6.71	- 39.0
Pond Index	1,254,010	764,942	- 39.0
Coot Brood Index	254,178	21,597	- 91.5
<u>Broods Per Square Mile</u>			
AW	4.26	1.02	- 76.1
AE	5.81	4.77	- 17.9
BE	8.02	2.74	- 65.8
BW	4.12	2.73	- 33.7
C	2.27	0.61	- 73.1
<u>PLB Per Square Mile</u>			
AW	0.87	2.10	/ 141.4
AE	2.33	8.01	/ 243.8
BE	0.89	3.55	/ 298.9
BW	0.50	3.71	/ 642.0
C	0.20	1.54	/ 670.0
<u>Ponds Per Square Mile</u>			
AW	6.65	3.77	- 43.5
AE	27.63	14.57	- 47.3
BE	12.98	7.94	- 38.8
BW	7.10	6.50	- 8.5
C	3.13	2.99	- 4.5
<u>Coot Brood Per Square Mile</u>			
AW	1.24	0.04	- 96.8
AE	0.59	0.27	- 54.2
BE	4.90	0.24	- 95.1
BW	1.54	0.41	- 73.4
C	0.25	0.02	- 92.0

Brood and Late Nesting Indices (Aerial) - Southern Saskatchewan, July Survey, 1958

Broods

Late nesting index
65

Species	STRATA					Province Totals
	A-West	A-East	B-East	B-West	C	
Not Speciated	38,357	69,635	92,390	45,819	6,934	253,135
Pintail	3,900	9,000	13,500	4,800	700	31,900
Mallard	41,300	40,300	59,000	33,000	9,000	182,600
Baldpate	2,900	11,700	6,700	1,900	-	23,200
Shoveler	500	4,200	1,700	3,800	700	10,900
Gadwall	7,300	1,800	1,700	3,800	2,100	16,700
Blue-winged Teal	8,200	29,500	11,800	-	700	50,200
Green-winged Teal	-	1,500	1,700	900	-	4,100
Subtotal Paddlers	64,100	98,000	96,100	48,200	13,200	319,600
Scaup	12,100	9,700	6,700	4,800	2,100	35,400
Canvasback	1,500	2,100	3,400	-	700	7,700
Redhead	500	2,700	5,000	-	-	8,200
Ringneck	-	1,200	-	900	700	2,800
Ruddy	900	3,300	8,500	7,500	700	20,900
Goldeneye	-	-	-	-	-	-
Bufflehead	-	-	-	-	-	-
Scoter	-	-	-	900	-	900
Subtotal Divers	15,000	19,000	23,600	14,100	4,200	75,900
GRAND TOTAL DUCKS	79,100	117,000	119,700	62,300	17,400	395,500
Coot Broods	1,331	3,960	8,186	7,942	178	21,597
Pond Index	141,812	212,774	267,423	109,151	33,782	764,942

Comparative Brood and Late-Nesting Indices (Aerial) - Southern Saskatchewan, July Survey 1953-58

Species	1953	1954	1955	1956	1957	1958
Broods						
Not Speciated	183,600	100,400	317,400	422,200	615,839	253,135
Pintail	32,900	11,500	79,400	18,200	5,385	31,900
Mallard	107,900	82,900	180,400	79,700	41,507	182,600
Baldpate	21,100	17,000	21,300	12,000	4,012	23,200
Shoveler	13,400	5,200	22,800	12,000	2,243	10,900
Gadwall	14,800	13,800	28,500	16,400	3,460	16,700
Blue-winged Teal	35,400	24,100	77,600	54,300	11,767	50,200
Green-winged Teal	3,500	5,500	8,000	2,200	1,381	4,100
09						
Subtotal Paddlers	229,000	160,000	418,000	194,800	69,755	319,600
Late Nesting Indices						
Scaup	28,500	11,300	4,300	26,200	27,504	35,400
Canvasback	15,700	2,700	15,500	7,300	1,707	7,700
Redhead	8,000	4,200	8,400	10,500	1,943	8,200
Ringneck	3,000	4,500	3,700	100	204	2,800
Ruddy	14,000	18,000	20,000	21,300	7,449	20,900
Goldeneye	-	-	-	-	-	-
Bufflehead	500	-	900	-	-	-
Scoter	2,500	1,200	44,100	900	-	900
Subtotal Divers	72,200	43,700	96,900	66,300	38,807	75,900
GRAND TOTAL DUCKS	301,200	203,700	514,900	261,100	108,562	395,500
Coot Broods	8,380	4,400	21,000	81,800	254,178	21,597
Pond Index	2,551,400	3,307,100	3,793,700	1,753,200	1,254,010	764,942

SOUTHERN SASKATCHEWAN - Continued**Conclusions**

All indications point to the poorest flight from Saskatchewan in the past six years.

It is difficult to make forecasts on individual species production due to the inadequacies of the July production survey methods. However, considering May breeding population indices and production success, it appears that the mallards flight will not be in too bad a shape; divers indicate a continuous major decline and other species indicate losses.

WYOMING

Weather and Water Conditions

The nesting season of 1957 was characterized by wet weather and high water. The picture was somewhat different in 1958 for in the stock-pond country of northeastern Wyoming surface water was below normal. However, other areas compensated to some degree. For example, on the Laramie Plains of southern Wyoming an abundance of water areas was carried over from the summer of 1957.

Throughout the remainder of the state water areas appeared to be about normal.

Runoff from the mountains varied from above normal in some regions to way below in others. The runoff in most areas was about two weeks early this year and was not considered to be as lengthy as in 1957.

Summer rains have maintained most brooding habitat at a normal level.

Breeding Population Indices

Table I presents a summary of the duck breeding ground survey for 1958. The estimated breeding pair population for 1958 falls 13.9% below the number recorded for 1957. However, the estimated population is up some 6.9% from the four-year average.

In computing the total duck population during the nesting season we have combined the breeding pairs with birds that were found in groups. It will be seen in Table I that the total population for 1958 is 23.2% greater than 1957 and 9.5% greater than the four-year average. Undoubtedly many of the birds which are placed in the group category are potential nesters which move into the higher elevations as the country opens up. Unfortunately at this time we have no way of measuring how many of these birds do this.

Table 2 shows the long-term breeding ground trend for Wyoming geese. For the state as a whole there is no change from 1957 numbers and the state-wide total is 14 per cent below the long-term average. Attention is directed to the two Wyoming drainages which have been down in recent years (the Green and the North Platte). The 1958 count on the Green River registered no change from the levels of 1956 and 1957 and was 26 per cent below the long-term average. The North Platte drainage showed a substantial increase over the all-time low of 1957 and is now 20 per cent below the long-term average. Both of these drainages are still far below the levels existing prior to the beginning of the recent downward trend.

Production Data

Brood survey routes for geese and ducks have not yet been established in Wyoming. However, in Table III a comparison is made of brood counts on the Hutton Lake Refuge for the past two years. It is felt that these data are quite representative of the production areas on the Laramie Plains. It will be seen in Table III that in 1958 the number of observed broods increased as did the average brood size. Brood count data are not available for the remainder of Wyoming.

Conclusions

It appears from the data available that the fall flight of ducks from Wyoming will be about the same as 1957 and somewhat greater than the flights of 1955 and 1956. The fall flight of geese will be about the same as 1957 but somewhat below the long-term average.

TABLE I
SUMMARY OF DUCK BREEDING GROUND SURVEY
WYOMING 1957 - 1958

Species	Pairs		Estimated Population			Total 1957	1958	% Change From 1957	% Change From 1957	% Change From 4-year Average
	1957	1958	% Change From 1957	% Change From 4-year Average						
Mallard	40,424	32,946	- 18.5	+ .3		85,405	77,081	-	9.8	+ 1.2
Pintail	9,435	11,020	+ 16.8	+43.9		18,874	31,335	+	66.0	+64.4
Teal	8,020	7,347	- 8.4	+10.4		9,807	15,117	+	54.2	+17.0
Shoveller	4,721	3,298	- 30.1	- 8.2		5,274	7,395	+	40.2	- 1.3
Gadwall	2,240	3,077	+ 37.4	+18.8		3,436	6,157	+	79.2	+ 9.9
Baldpate	6,243	3,781	- 39.4	+10.7		7,479	7,894	+	5.6	+28.0
Redhead	236	268	+ 13.6	+7.3		247	533	+	115.8	-45.6
Coot	4,127	1,569	- 62.0	- 7.0		4,293	3,405	-	20.6	-20.2
A. Merganser	1,772	1,890	+ 7.0	+58.7		2,701	4,919	+	82.2	+80.8
Ruddy	0	107	+107.0	+ 4.0		0	860	+	860.0	-21.1
Scaup	354	214	- 39.5	-35.2		373	430	+	15.2	-33.7
Unknown	236	1,514	+541.5	-45.1		1,414	16,853	+1,090.0	-14.8	
	77,808	67,031	- 13.9	+ 6.9		139,303	171,979	+	23.2	+ 9.3

TABLE II
SUMMARY OF CANADA GOOSE BREEDING GROUND SURVEY
WYOMING 1952-1958

Drainage	Total Number of Geese							Per cent Change		
	1952	1953	1954	1955	196	1957	1958	Average	From 1957	From Average
Snake River	334	506	267	437	347	350	208	350	- 41	- 41
Bear River	361	369	183	270	264	299	331	299	+ 11	+ 11
Green River	360	336	204	119	160	162	161	215	0	- 26
North Platte River	-	509	296	219	147	81	194	241	+140	- 20
Wind River	-	13	103	97	88	90	90	80	0	+ 12
Totals	-	1,733	1,053	1,142	1,006	982	984	1,150	0	- 14
Combined Green and North Platte Rivers:	-	845	500	338	307	243	355	431	+ 46	- 18

TABLE III*

Brood Counts

Hutton Lake Refuge

Albany County, Wyoming

Species	No. Broods	1957		Av. Brood Size	No. Broods	1958		Av. Brood Size
		Total	Young			Total	Young	
Mallard	18		106		25		215	
Gadwall	2		12		5		43	
Baldpate	3		12		8		57	
Pintail	6		38		7		60	
GW-Teal	2		13		1		7	
BW-Teal	3		14		30		238	
Cinnamon Teal					1		9	
Shoveler	3		12		5		18	
Redhead	3		17		6		42	
Canvasback	4		23		10		63	
Ruddy	3		30		4		28	
Total	47		277	5.87	102		780	7.65

*Data furnished through courtesy of Hutton Lake Wildlife Refuge Manager.

NORTH DAKOTAWeather and Water Conditions

Field conditions, Statewide were advanced during May. It was noted that extremes in conditions existed over the State. Field work in some sections was hampered by too much temporary surface water. This condition existed in the southeast and east-central sections of the State. Elsewhere, top soil moisture was needed. Several days of intense winds served to intensify the need for rainfall to an acute stage. Wind erosion more than drouth caused some reseeding. Damage to soil by winds was limited to areas of light soil.

Relief came to crops and range land in late May and June. Light to heavy rains did improve the crop outlook. June was cool and shower activity continued to blanket the State.

Local severe hail storms in some sections of North Dakota may have caused considerable damage to broods.

Interesting to note is the increase of water areas per square mile in July 1958 compared to 1957. (See aerial data summary) Heavy rains in the East and Central Stratum gave temporary relief. Pot holes that were dry in May held some water in July. Late nesting, or broods may have been given relief in areas of critical water levels.

Breeding Population Indices1958 Breeding Population Indices by Strata

Species	Strata						Total	
	West		Central		East			
	No.	%	No.	%	No.	%		
Pintail	6,556	23	66,621	19	7,233	24	80,410 20	
Mallard	17,044	59	126,562	36	9,644	32	153,250 38	
Baldpate	-	-	11,611	3	-	-	11,611 3	
Shoveler	-	-	20,144	6	1,206	4	21,350 5	
Gadwall	-	-	21,472	6	6,028	20	27,500 7	
B-W Teal	5,244	18	70,643	20	3,616	12	79,503 19	
G-W Teal	-	-	909	TR	-	-	909 TR	
Scaup	-	-	4,476	1	-	-	4,476 1	
Canvasback	-	-	21,018	6	2,411	8	23,429 6	
Redhead	-	-	5,805	2	-	-	5,805 1	
Ruddy	-	-	455	TR	-	-	455 TR	
TOTAL	28,844	100	349,716	99	30,138	100	408,698 100	

NORTH DAKOTA--Continued

Comparison of the 1958 Aerial Survey Data with that of 1957*

Stratum	Duck Population Index		Coot Index		Pond Index	
	1957	1958	1957	1958	1957	1958
West	26,389	28,844	0	920	33,140	49,710
Central	401,796	349,716	10,908	22,424	160,218	180,520
East	10,664	30,138	0	2,705	18,281	30,910
TOTAL	438,849	408,698	10,908	26,049	211,639	261,140

Percent of change
of the 1958 index -6.87 /138.81 /23.39
from that of 1957

*The 1957 data was reworked to make it comparable to the 1958 data.

Production Indices

Summary of Air Data - July, 1958

North Dakota Aerial Survey

	West	Central	East	State Total
Size in Square Miles	23,474	33,861	13,330	70,665
Sample Size in Square Miles	38	150	17	205
Broods Actually Seen	3	131	2	136
Broods/Square Mile	.08	.87	.12	.7
Brood Index	1,878	29,459	1,600	32,937
Sample Late Nesting Index	1	93	4	98
Late Nesting Index/Square Mile	.03	.62	.24	.48
Late Nesting Index	704	20,994	3,199	24,897
Ponds Actually Seen	106	761	78	945
Ponds Per Square Mile	2.8	5.1	4.6	4.6
Pond Index	65,727	172,691	61,318	299,736
Coot Brood Seen	0	23	0	23
Coot Brood/Square Mile	0	.15	0	.15
Coot Brood Index	0	5,079	0	5,079

NORTH DAKOTA--ContinuedLate Nesting Index

Species	West	Central	East	State	% Comp.
Mallard	--	8,250	3,199	11,449	46.0
Baldpate	--	756	--	756	3.0
Shoveler	--	756	--	756	3.0
Gadwall	--	4,493	--	4,493	18.1
Blue-winged Teal	--	6,004	--	6,004	24.1
Scaup	--	735	--	735	3.0
Unidentified*	704	--	--	704	2.8
TOTAL	704	20,994	3,199	24,897	100.0

*None of the late nesting ducks were identified in the West Stratum.

Brood Size Class	Observed in Sample		Index		Average Size
	# Broods	# Ducklings	# Broods	# Ducklings	
II	43	245	10,681	60,882	5.7
III	59	334	14,293	81,470	5.7

Comparison of 1957-1958 Mid-July Aerial Survey
in North Dakota

	1957	1958	% Change
Broods Actually Seen	140	136	
Broods/Square Mile	.7	.7	
Brood Index	39,250	32,937	- 16%
Late Nesting Index	46,845	24,897	- 47
Pond Index	198,755	299,736	+ 51
Coot Brood Index	11,445	5,079	- 56

Average Brood Size

Class II	5.1	5.7	+ 12
Class III	5.2	5.7	+ 10

Conclusions

Total waterfowl reproduction in 1958, in North Dakota should be similar or slightly below the waterfowl reproduced in 1957.

SOUTH DAKOTA

Weather and Water Conditions

During May, water conditions were characterized by a general dryness, with a spotty distribution of water areas. South Dakota received very little snow during the winter of 1957-1958; consequently no spring run-off occurred to fill the potholes. Very good water area densities were found in the northwestern quarter of Stratum No. 2, and this apparently was due to heavy local rains which occurred there in late April. Over most of the remainder of the State many potholes were dry at the end of the May survey period. Lake Preston was dry and cultivation of the lake bottom had begun.

By June 1st scattered rains began and continued generally over the State through mid-July. The greatest rainfall during this period occurred west of the Missouri River and in the north-central and northeastern part of the State. Temperatures for the period were well below normal. During the last two weeks of July temperatures continued below normal precipitation was light.

As of August 1, South Dakota was 5" below normal rainfall. However, cool weather had reduced water losses that would have normally occurred and the present state-wide water conditions are moderately good. The most favorable conditions exist west of the Missouri River and in the north-central part of the State.

Usually the July water area index is lower than that of May. This was true in Stratum 2 where a decrease of 15% was observed. In the remaining two strata increases were noted of 40% in Stratum 1 and of over 200% in Stratum 3 (West River).

Breeding Population Indices

Although the pond density dropped from the previous year, the waterfowl breeding population increased somewhat. The population and the water situation is still considerably below the average of 1950-1956. The species composition as presented in the accompanying table was taken entirely from the aerial data. This differs markedly from the composition obtained by ground observations during previous years, as is to be expected. Since this difference exists, no application should be attempted using this species composition breakdown.

South Dakota Waterfowl Breeding Population Survey - May 1958

	STRATA			
	1	2	3	Total
Sample Population	674	4,753	1,011	
Sample Size (sq. mi.)	112.7	526.5	214.25	
Strata Area (sq. mi.)	21,481	25,591	26,598	
Expansion Factor	190	48.6	124.1	
Population Index	128,050	231,000	125,450	484,500
Ducks/sq. mi.	5.9	9.0	4.7	6.6

Species Comp.	Number	%	Number	%	Number	%	Number	%
Pintail	32,000	25	55,450	24	40,150	32	127,600	26
Mallard	60,150	47	106,250	46	70,250	56	236,650	49
Shoveler	7,700	6	23,100	10	5,000	4	35,800	7
Gadwall	-	-	2,300	1	-	-	2,300	1
B-W Teal	26,900	21	34,650	15	8,800	7	70,350	14
Scaup	-	-	2,300	1	1,250	1	3,550	1
Redhead	1,300	1	2,300	1	-	-	3,600	1
Ruddy	-	-	4,650	2	-	-	4,650	1
	128,050	100	231,00	100	125,450	100	484,500	100

Percent Lone Drakes

Pintail	84.3	26.0	17.6	37.9
Mallard	59.2	74.0	58.0	65.5
B-W Teal	42.0	40.7	18.0	38.1

For Survey Area 53.0

Coot Index	0	1,263	248	1,511
Pond Index	69,540	139,190	60,809	269,539
Ponds/sq. mi.	3.2	5.4	2.3	3.65

Comparison of Waterfowl Breeding Populations and
Water Areas in South Dakota - 1950 to 1958

Item	1957	1958	Percent Change	1950-1956 Average	Percent Difference
Population Index	399,300	484,519	+ 21.4	660,700	- 26.6
Ponds/sq. mi.	5.04	3.65	- 27.5	4.8	- 24.0
Ducks/ sq. mi.	5.34	6.6	-	9.26	- 28.7

Production Indices

The observed brood density measured in broods per square mile is above 1957 by 25% (0.4 to 0.5) but still below the 1953-1956 average of 0.533 broods/sq. mile. The number of July water areas per square mile has also increased from 1957. It is impossible to demonstrate this precisely because of differences in strata boundaries existing between the State survey of last year and the survey of 1958. However, the increase is believed to be approximately 50% in eastern South Dakota.

The late nesting index indicates a large number of broods yet to come off the nest. Apparently this July survey was conducted below the peak of hatching and about 60% of the broods were yet to be produced. Blue-winged teal will compose over 40% of these potential later broods.

South Dakota - July Survey

Brood Index

Stratum 1	Stratum 2	Stratum 3
-----------	-----------	-----------

5,712	17,654	14,661
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Total 38,027 (Square miles)
broods/sq. mi. ■ 0.51

South Dakota - July Survey - Continued

Late Nesting Index

Species	Stratum 1	Stratum 2	Stratum 3	State Total
Pintail	-	2,910	745	3,655'
Mallard	-	9,118	9,194	18,312
Shoveler	1,523	970	745	3,238
Gadwall	-	485	-	485
B-W Teal	4,950	16,005	3,727	24,682
Redhead	-	1,940	-	1,940
Ruddy	4,950	2,425	-	7,375
TOTAL	11,423	33,853	14,411	59,687
Coot Broods	381	2,619	-	3,000
Pond Index	94,438	120,280	187,866	402,584
Ponds/sq. mi.	4.5	4.7	7.1	5.4

Conclusions

In view of the increase in breeding population and broods it is concluded that there will be a moderate increase in the fall flight of ducks from South Dakota as compared to 1957.

COLORADO

Weather and Water Conditions

Weather and water conditions in Colorado during the spring and early summer were considered good to excellent for waterfowl nesting and production. In general, water levels in eastern Colorado and the San Luis Valley were far above average, and the rest of the State was at least on a par with past years. All of this was due to a combination of good spring precipitation, continuing early summer rains, and a normal snowpack which provided ample water to all areas.

The writers believe that over-all weather and water conditions in Colorado were and are highly favorable for waterfowl production and brood rearing.

Breeding Population Indices

Examination of the duck breeding-pair estimates by area reveal that the 1958 counts were up 8.8 percent from 1957 and 8.7 percent above the four-year average (Table 1).

Table 1. Summary of Colorado Duck Breeding Ground Conditions - 1958 with 1957 and the 4-Year Average for Comparison

Area	Total Estimated Breeding Pairs		
	4-Year Average	1957	1958
San Luis Valley	6,413	4,838	8,720
North Park	3,486	3,411	3,534
South Platte Valley	1,680	1,657	1,782
Cache la Poudre Valley	1,701	2,800	1,419
Yampa Valley	2,821	3,356	2,077
Brown's Park	122	208	199
TOTALS	16,307	16,260	17,731

Goose breeding conditions held fairly steady with 1956 and 1957 figures. Previously projected breeding-pair estimates are known to be high, therefore, this report will use the actual ground count figures for the years 1956, 1957 and 1958 (Table 2).

COLORADO - Continued

Table 2. Comparison of Colorado Goose Breeding Ground Surveys - 1956-1958

Area	Total Observed Breeding Pairs											
	1956				1957				1958			
	Nesting Pairs	Total Young	Total Birds	Nesting Pairs	Total Young	Total Birds	Nesting Pairs	Total Young	Total Birds			
Yampa River	12	36	78	12	13	55	11	42	90			
Green River	4	17	27	4	16	38	5	64	76			
TOTAL	16	53	105	16	29	93	16	106	166			

Species composition of the breeding duck population was quite similar to past years (Table 3). Mallards made up the bulk of the breeding birds (56.6%) and pintails (15.7%) were the only other species to exceed 10 percent of the total number of ducks. Shovelers also showed a marked increase, due probably to the abundance of shallow water areas this year.

Table 3. Species Composition of the Colorado Breeding Population 1958, 1957 and 4-Year Average

Species	Number of Ducks				Species Composition		
	4-Year Average	1957	1958	Average	Percent		
					1957	1958	
Mallard	10,475	9,944	10,030	64.3	61.2	56.6	
Blue-winged Teal	926	1,208	651	5.6	7.4	3.7	
Pintail	836	1,023	2,800	5.2	6.3	15.7	
Gadwall	1,343	1,150	1,270	8.3	7.1	7.2	
Baldpate	354	276	140	2.1	1.7	0.8	
Shoveler	381	375	1,181	2.4	2.3	6.5	
Cinnamon Teal	594	562	418	3.6	3.5	2.4	
Green-winged Teal	429	682	260	2.7	4.2	1.5	
Redhead	502	739	544	3.0	4.5	3.1	
Scaup	306	201	294	1.7	1.2	1.7	
Ruddy Duck	26	-	87	0.2	-	0.5	
Bufflehead	3	-	-	0.1	-	-	
American Merganser	135	100	56	0.8	0.6	0.3	
TOTALS	16,307	16,260	17,731	100.0	100.0	100.0	

COLORADO - Continued

Conclusions

Considering the excellent weather and water conditions, and the increased breeding population, it is believed that the fall duck flight will be average or above, probably similar to 1957.

Geese still present a fairly dismal picture, due in part to the lack of sub-adult birds resulting from poor production or over-harvest in previous years. There appears to be a definite need for continued restrictions and protection for Canada geese in northwest Colorado.

NEBRASKAWeather and Water Conditions

Conditions in the Nebraska Sandhills were generally favorable to the 1958 waterfowl breeding population. Very mild weather prevailed during the winter and most lakes were free of ice by March 1. Continued seasonable weather during the breeding season resulted in an advanced phenology at least two weeks earlier than in 1957 and perhaps as much as one week earlier than the locally accepted average.

Water conditions were fair to excellent and generally reflected the somewhat spotted precipitation which was locally average to considerably above average for 1957 and the first half of 1958. The southern portion of the eastern Sandhills (Wheeler and Garfield Counties) and the western portion of the central Sandhills (central Cherry County) had only average precipitation and had somewhat limited amounts of available breeding habitat. The remainder of the Sandhills showed spectacular recovery from the drought of 1954-56 and habitat conditions remained generally good throughout the breeding and nesting seasons. All the Sandhill lakes, the levels of which are generally controlled by the ground water table, were up from 1957 and in some cases, equaled the record levels of 1950-52.

A rather severe dry-up of the small potholes in the eastern and central Sandhills resulted from the brief hot, dry weather of early June. However, above average precipitation in late June and July restored many of these areas back and also maintained excellent water levels in all lakes and marshes.

Breeding Population IndicesBreeding Population Surveys

Table I 1958 Waterfowl Population Indexes

	Eastern	Central	Western	Over-all
Square Miles in Study Area				
Stratum B	734	1,815	2,814	
Stratum A	3,859	2,824	4,186	
Observed Ducks per Square Mile				
Stratum B	3.70	0.32	3.80	
Stratum A	5.66	11.80	25.00	
Aerial Survey Index*	24,558	33,904	115,343	173,805
Percent Non-breeders Observed	8.9	6.1	29.9	
Breeding Duck Index	22,384	31,854	80,918	
Percent Lone Males Observed	39.2	34.1	17.3	
Hen-on-nest Correction	9,613	11,565	20,042	
Corrected Breeding Ducks Indexes	31,997	43,419	100,960	176,376

* Duck per square mile x square miles in study area.

NEBRASKA - Continued

Table II. 1958 Waterfowl Population Trends

1958 Aerial Index	173,805
1957 Aerial Index	124,165 change to 1958 + 40.0%
Average of 1954-57 aerial indexes	123,534 change to 1958 + 40.7%
1958 Breeding Duck Index*	176,376
1957 Breeding Duck Index	154,800 change to 1958 + 13.9%
Average of 1954-57 Breeding Duck Indexes	128,142 change to 1958 + 37.6%

* Corrected for non-breeding or loafing ducks and hens on nests which could not be seen during the aerial surveys.

These surveys indicated the 1958 breeding duck population in the Sandhills to have increased from that of the 1957 season and to have increased significantly from the average breeding population during the four prior years. As in past years, observations indicated this increase to have been directly correlated to the increased habitat available at the beginning of the season.

It can be noted from Table III that increases were general for all species except the blue-winged teal which species had been attracted in large numbers by the late-appearing habitat available in 1957.

Table III. 1958 Waterfowl Breeding Population Species Composition and Trends

	Corrected Species Indexes*			Over-all Population	Percent of	Percent
	Eastern	Central	Western		1958	1957
Mallard	3,269	7,079	17,719	28,067	15.9	26,799 + 4.7
Gadwall	952	1,065	8,068	10,085	5.7	5,664 + 78.1
Baldpate	405	271	1,230	1,906	1.1	1,281 + 48.8
Pintail	3,566	8,756	20,347	32,669	18.5	18,575 + 75.9
G-W Teal		136	615	751	0.4	176 + 326.7
B-W Teal:	20,743	21,638	28,920	71,301	40.4	78,659 - 9.4
Shoveler	2,790	3,730	13,737	20,247	11.5	13,703 + 47.8
Redhead	135	378	5,973	6,486	3.7	5,133 + 26.4
Canvasback						2,931
Scaup		126	1,200	1,326	0.8	889 + 49.2
Ruddy		240	3,151	3,391	1.9	990 + 242.5
Ringneck	147			147	0.1	
TOTAL	31,997	43,419	100,960	176,376	100.0	154,800 + 13.9

* Adjusted for hens-on-nest and non-breeders.

NEBRASKA - Continued**Production Indices**

All indications were that the 1958 waterfowl production success was at least average. The first broods were reported and observed somewhat earlier than the average of the ten preceding years; however, the peak brood occurrence was very nearly average. Brood surveys made during the period July 7 -- 11 showed that of 63 broods of all species observed, 56% were of age class I, 38% of age class II and 6% of age class III. As the observed broods were predominately blue-winged teal, these data indicate hatching peaks comparable to the average.

Aerial brood counts were again made over two select breeding population routes in each area. These counts which were designed to provide an estimate of the production success of the breeding population, indicate one brood per 18.8 ducks observed on the breeding population surveys in the eastern Sandhills, one brood per 7.7 ducks in the central Sandhills and one brood per 16.1 ducks in the western Sandhills. The survey conditions encountered were so different from those of the preceding surveys that comparison of the results is impossible.

An average of 6.8 ducklings was observed in the broods of all age classes and all species.

Conclusions

From the data available, it may be assumed that the number of ducks entering the Flyway from Nebraska in 1958 will show some increase over 1957 and a substantial increase over the average of the 1954-57 fall flights.

Mississippi Flyway Data

Waterfowl Kill Information

The following table presents the estimated number of waterfowl bagged and waterfowl knocked down but not retrieved during the 1956-57 and 1957-58 shooting seasons as determined by the Waterfowl Hunter Mail Survey:

Species	1957-1958	1956-1957	Percent Change 1956-1957 to 1957-1958
Mallard	2,587,149	2,775,452	- 6.78
G-W Teal	289,073	438,706	- 34.11
B-W Teal	276,559	407,538	- 32.14
Pintail	199,943	242,933	- 17.70
Black Duck	177,943	218,510	- 18.57
Scaup	283,652	211,140	/ 24.34
Canvasback	183,183	167,399	/ 9.43
Redhead	140,538	75,871	/ 85.23
Ring-necked	107,561	52,508	/ 104.85
Gadwall	11,430	44,270	- 74.18
Am. Wigeon	55,701	41,428	/ 34.45
Ruddy	19,290	36,659	- 47.38
Shoveler	27,285	31,023	- 12.05
Merganser	22,587	29,722	- 24.01
Goldeneye	44,135	18,546	/ 137.98
Bufflehead	26,608	18,402	/ 44.59
Scoter	1,987	3,757	- 47.11
Wood Duck	60,760***	3,035	/ 1901.98*
Others	2,078	339	/ 512.98
Total Ducks Retrieved	4,517,462	4,817,238	- 6.22
Total Ducks not retrieved	1,110,958	1,107,297	N.C.
Total Duck Kill	5,628,420	5,924,535	- 5.00
Canada Goose**	163,244	178,540	- 8.57
Blue Goose	50,798	46,563	/ 9.10
Snow Goose	31,922	32,997	N.C.
White-fronted Goose	15,477	8,007	/ 93.29
Total Geese Retrieved	261,441	266,107	N.C.
Total Geese not retrieved	55,658	37,328	/ 49.11
Total Goose Kill	317,099	303,435	/ 4.50
Total Coot Retrieved	258,768	377,315	- 31.42
Total Coot not retrieved	64,018	98,371	- 34.92
Total Coot Kill	322,786	475,686	- 32.14

* No open season on Wood Duck during 1956-57.

** All white-cheeked geese included as Canada geese.

*** Closed season on Wood Ducks in the States of Kentucky, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri and Wisconsin.

Mississippi Flyway Data

MISSISSIPPI FLYWAY

Number of Hunters, Average Times Hunted, Seasonal Bag, Seasonal Unretrieved Kill and Daily Bag as Determined by the Waterfowl Hunter Mail Survey.

	1957-1958	1956-1957	Percent Change 1956-1957 to 1957-1958
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Number of Potential Hunters

Over 15*	1,004,255	1,016,338	N.C.
Under 16	75,300	94,193	- 20.06
	<u>1,079,555</u>	<u>1,110,531</u>	N.C.

Number of Active Hunters**

Over 15	870,192	870,605	N.C.
Under 16	58,180	69,864	- 16.72
	<u>928,372</u>	<u>940,469</u>	N.C.
Average Times Hunted**	4.289	4.382	N.C.

Average Seasonal Bag**

<u>Over 15</u>	Ducks	5.184	5.309	N.C.
	Geese	.302	.296	N.C.
	Coot	.296	.396	- 25.25
<u>Under 16</u>	Ducks	2.376	2.795	- 14.99
	Geese	.112	.123	- 8.94
	Coot	.142	.471	- 69.85

Average Seasonal No. not retrieved**

<u>Over 15</u>	Ducks	1.222	1.209	N.C.
	Geese	.061	.040	+ 52.50
	Coot	.068	.108	- 37.04
<u>Under 16</u>	Ducks	.801	.782	N.C.
	Geese	.043	.030	+ 43.33
	Coot	.083	.061	+ 36.07

Average Daily Bag**

<u>Over 15</u>	Ducks	1.209	1.211	N.C.
	Geese	.070	.068	N.C.
	Coot	.069	.090	- 23.33
<u>Under 16</u>	Ducks	.554	.638	- 13.16
	Geese	.026	.028	N.C.
	Coot	.033	.107	- 69.15

* Individuals who purchased a Duck Stamp with intent to hunt.

** Individuals who hunted at least once.

Winter Trend Data - Mississippi Flyway

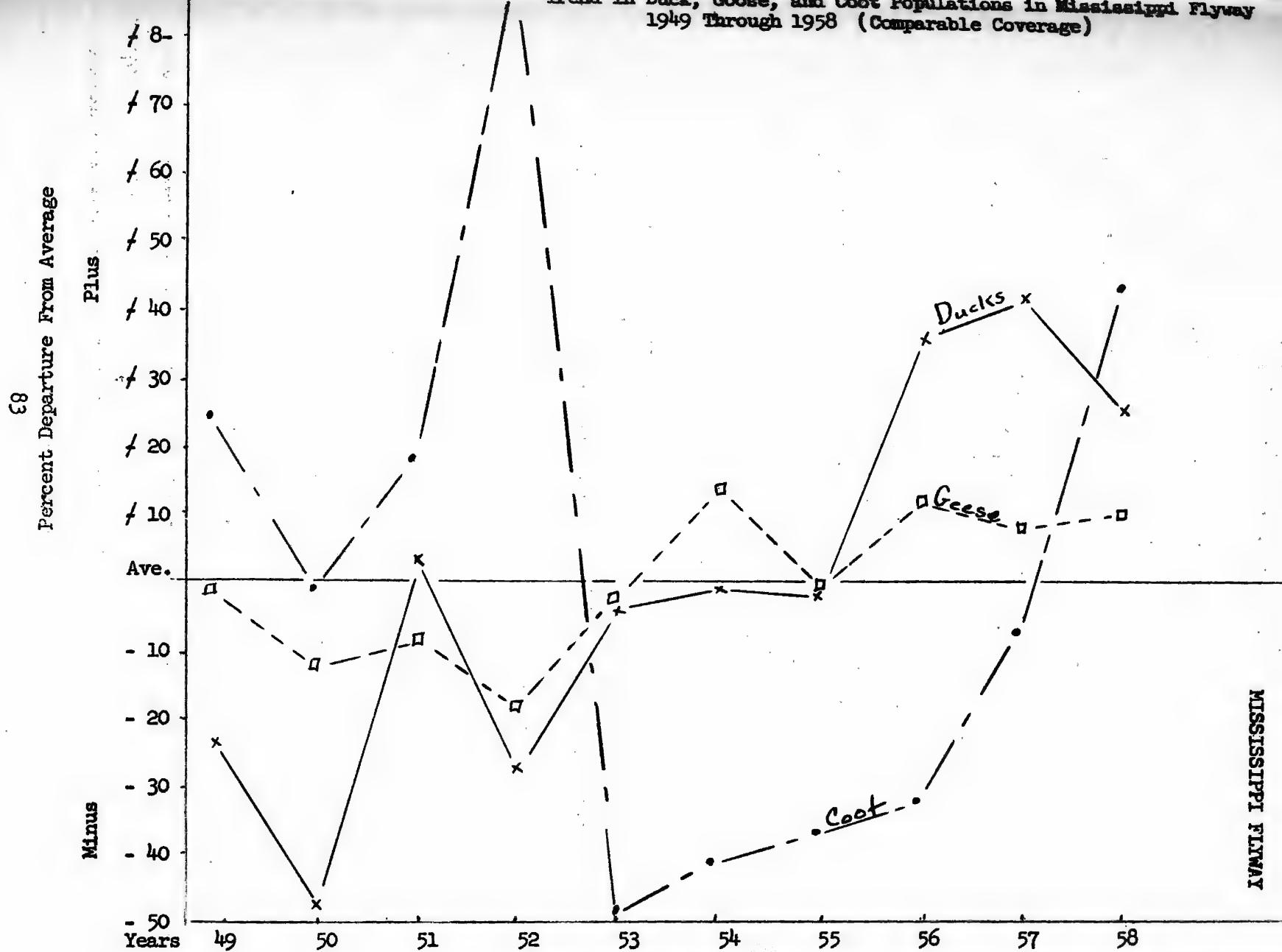
On the basis of comparable coverage between 1957 and 1958 in the Mississippi Flyway there was a 12 percent decrease in ducks, a 2 percent increase in geese, and a 58 percent increase in coot. Total waterfowl decreased 9 percent.

Species composition and percent change between 1957 and 1958 for individual species are presented in the following table. In the Graph which follows the table are presented trend data for ducks, geese and coot for the period 1949 through 1958.

Species Composition - Mississippi Flyway - 1957 and 1958
(Comparable Coverage)

Species	Percent of Birds Identified		Percent Change
	1957	1958	
Mallard	62.6	51.7	- 24.8
Pintail	6.7	7.1	- 3.2
Blue Goose	4.4	4.9	+ 1.3
Green-winged Teal	4.3	4.1	- 13.3
Canada Goose	3.9	4.2	- 12.5
Scaup	3.3	3.1	- 14.1
Black Duck	2.8	3.5	+ 14.0
Gadwall	2.5	4.4	+ 62.8
Coot	2.2	3.8	+ 57.5
Canvasback	1.6	1.3	- 25.8
Ringneck	1.1	.8	- 31.8
Baldpate	.9	3.8	+ 306.7
Ruddy	.8	.3	- 64.7
Shoveler	.7	1.9	+ 143.5
Goldeneye	.5	.5	N.C.
Merganser	.4	.7	+ 51.1
Snow Goose	.4	.5	+ 21.0
Redhead	.4	.4	- 4.9
Wood Duck	.3	.5	+ 40.7
Old Squaw	.1	.2	+ 43.6
Blue-winged Teal	.1	2.0	--
White-fronted Goose	Tr.	.2	--
Bufflehead	Tr.	.1	--
Scooter & Eider	Tr.	Tr.	--
Whistling Swan	Tr.	Tr.	--
TOTAL	100.0	100.0	- 9.2

Trend in Duck, Goose, and Coot Populations in Mississippi Flyway
1949 Through 1958 (Comparable Coverage)



Breeding Ground Survey Data

NORTHERN SASKATCHEWAN, NORTHERN MANITOBA, AND ONTARIOWeather and Water Conditions

Phenological development in the survey area was 10 days to two weeks earlier than "normal" and the season was considered advanced about two weeks over last year.

A comparatively mild, open winter with reduced precipitation resulted in little runoff and progressively declining water levels. Low humidity and high winds were prevalent during May which contributed to the presence of widespread fires.

Breeding Population Indices

It is usual during the breeding population survey in this area to record the bulk of the duck population (except scaup) as either pairs or single drakes. However, during the 1958 survey a surprising portion of the total were observed as groups of mixed sexes. This was particularly true of mallards and pintails. It is unlikely that these grouped birds were attempting to breed.

Aerial Coverage - May 1958

Province	Strata Description	Area Square Miles	No. 18-Mile Segments	Lineal Miles	Sq. Miles Surveyed
Ontario	Closed Forest (C)	195,572	75	1,350	337.5
Manitoba	Closed Forest (C)	67,360	55	1,090	247.5
Manitoba	Sask. River Delta (D)	3,960	12	216	54.0
Saskatchewan (South of 55° 30')	Closed Forest (C)	50,990	63	1,134	283.7
Saskatchewan (North of 55° 30')	Closed Forest (C)	111,070	33	604	151.0
TOTAL		418,952	238	4,394	1,073.7

Breeding Population Indices by Strata (1958) and Comparison with 1957 Totals

Species	STRATA					1958 Total	1957 Total	Percent Change
	Ontario	Man. D.	Man. C.	Sask. C South	Sask. C North			
Mallard	47,200	37,100	60,000	86,100	33,450	263,850	260,128	+ 1
Scaup	69,400	25,550	71,650	40,700	61,800	269,100	445,727	- 40
Merganser	122,150	-	20,000	6,300	69,500	217,950	132,906	+ 64
Canvasback	16,650	4,950	-	-	-	21,600	2,086	+ 935
Goldeneye	11,100	800	6,650	9,400	41,200	69,150	8,675	+ 697
Bufflehead	5,550	-	3,350	3,150	7,700	19,750	5,033	+ 292
Black Duck	5,550	-	-	-	-	5,550	-	-
Baldpate	-	4,100	1,650	-	2,550	8,300	6,500	+ 28
Pintail	-	4,950	-	1,550	-	6,500	12,188	- 47
B-W Teal	-	4,950	1,650	6,300	5,150	18,050	1,172	+ 1440
Scoter	-	-	-	-	36,050	36,050	53,382	- 14
G-W Teal	-	-	-	-	-	-	6,364	- 100
Gadwall	-	-	-	-	-	-	3,467	- 100
Shoveler	-	-	-	-	-	-	1,130	- 100
Redhead	-	-	-	-	-	-	6,215	- 100
Ringneck	-	-	-	-	-	-	1,156	- 100
1958 TOTAL	277,600	82,400	164,950	153,500	257,400	935,850	-	-
1957 TOTAL	176,350	86,932	192,612	159,092	331,143	-	946,129	- 1
Percent Change	+ 57	- 5	- 14	- 4	- 22	-	-	- 1

Total Duck Indices by Provinces - 1955--1958

Province	INDEX				Average	Percent From 1957	Change From Ave.
	1955	1956	1957	1958			
Ontario *	230,159	111,677	176,350	277,600	198,946	+ 57	+ 40
N. Manitoba	380,429	197,291	279,544	247,350	276,154	- 12	- 10
N. Sask.	658,649	262,585	490,235	410,900	455,592	- 16	- 10
TOTAL	1,269,237	571,553	946,129	935,850	930,692	- 1	+ 1

Conclusions

In view of the "grouped bird" observations made this year which is interpreted to be indicative of lack of breeding success, and the water deficient habitat conditions, a below average duck crop is expected from this area.

SOUTHERN MANITOBAWeather and Water Conditions

The spring of 1958 was one of the warmest and driest since the surveys were initiated. Fall rains were generally light and the breakup which began in late March and continued until a blizzard in late April contributed little runoff. Little moisture was added by this blizzard and no rains of any consequence occurred during the survey period. Several severe dust storms were encountered during the survey. In spite of the lack of recent precipitation and runoff, water levels in southern Manitoba were generally above normal. Sufficient surface water remained from previous years to maintain high levels in the larger water areas, and many areas which previous to 1955 were "temporaries" now have the characteristics of semi-permanent ponds. While very shallow temporary water is absent, there is no shortage of water in the parklands and prairies of Manitoba. The table below shows the number of water areas counted on the aerial surveys during the past eight years. The increase in the number of water areas in stratum "A" this year is probably a matter of interpretation on the part of the different crews involved.

Water Area Index - Southern Manitoba - May Aerial Survey

Year	Ponds in Stratum "A"	Ponds in Stratum "B"	Ponds in Strata "A" & "B"
1951	240,500	185,900	426,400
1952	174,200	155,400	329,600
1953	186,600	311,700	498,300
1954	258,200	1,075,400	1,333,600
1955	314,700	427,700	742,400
1956	390,700	614,800	1,005,500
1957	262,200	404,000	666,200
1958	351,500	264,400	615,900
Average 1951-57	272,300	429,900	702,200

The drought conditions of the fall, winter and spring continued until July 3, 4 and 5 when considerable rain fell in southern Manitoba. While some of this occurred as a general downpour in the Red River Valley and Portage Plains of the unimportant eastern portion of Stratum "B," most of the good duck production habitat received rather steady gentle rain, ideal for the farmer, but producing little runoff into the potholes. This

is illustrated by the July pond index indicating that the number of water areas in Stratum "B," increased over last year, while those in Stratum "A" decreased. Throughout the area, there will be sufficient water for broods, some portions still experiencing above normal levels.

Water Index - Southern Manitoba - July Aerial Survey

Years	Ponds in Stratum "A"	Ponds in Stratum "B"	Total
1954	472,400	384,200	856,600
1955	339,300	270,900	610,200
1956	425,900	411,600	837,500
1957	241,700	259,700	501,400
1958	163,300	341,000	504,300
Average	328,500	333,500	662,000

Breeding Population Indices

Some individuals of most species arrived early in 1958; all but the gadwall being present at the Delta Waterfowl Research Station by April 10. However, there was a considerable later movement of birds into the Province, presumably from the drier prairies to the south and west. Some of these birds remained as groups of pairs throughout the survey period. Since they were not seen as pairs or singles, their potential productivity is unknown and probably low. However, there is no question but what they will make up a portion of the fall flight. Hence, they are included as a separate population index of "flocked ducks," neither migrants nor actually nesting at the time they were seen. While it is usual in Manitoba to find from 50,000 to 75,000 scaup in this condition, such groups normally occur among other species in negligible numbers. However, such groups amounted to nearly 300,000 birds in 1958. On the other hand, the bulk of the population, amounting to nearly a million birds, occurred as drakes and separate pairs, indicating they were nesting or about to nest. There was an increase in most species over 1957 populations. The mallard, pintail and shoveler were the only species prominent in the records which did not increase in 1958.

May Waterfowl Populations - Southern Manitoba - 1957 - 1958

Species	1957 Strata "A" & "B"	Stratum "A"		Stratum "B"		Strata "A" & "B"		Species Composi- tion 1958	Percent Change** 1957-1958
		Drakes Pairs	Flocked* Ducks	Drakes Pairs	Flocked Ducks	Drakes Pairs	Flocked Ducks		
Pintail	99,300	47,000	2,500	26,100	-	73,100	2,500	7.6%	- 26.4%
Mallard	500,000	281,600	10,900	208,900	10,200	490,500	21,100	51.3%	- 1.9%
Baldpate	24,700	33,500	17,700	19,500	20,200	53,000	37,900	5.5%	+ 114.6%
Shoveler	38,300	20,500	-	7,700	-	28,200	-	2.9%	- 35.7%
Gadwall	5,500	4,600	-	3,100	-	7,700	-	.8%	+ 40.0
B-W Teal	62,700	80,400	12,700	44,500	3,300	124,900	16,000	13.1%	+ 99.2%
G-W Teal	3,400	6,200	-	1,000	-	7,200	-	.8%	+ 111.8%
Scaup	60,200	35,700	93,500	34,800	110,300	70,500	203,800	7.4%	+ 17.1%
Canvasback	31,400	32,500	4,400	24,100	-	56,600	4,400	5.9%	+ 80.3%
Redhead	16,900	10,700	200	15,900	5,100	26,600	5,300	2.8%	+ 57.4%
Ringneck	3,800	2,500	1,300	3,100	-	5,600	1,300	.6%	+ 47.4%
Ruddy	7,000	4,700	1,800	1,500	-	6,200	1,800	.6%	- 11.4%
Goldeneye	5,400	200	100	2,100	4,600	2,300	4,700	.2%	- 57.4%
Bufflehead	400	800	-	2,600	-	3,400	-	.4%	+ 750.0%
Scoter	1,300	700	-	-	-	700	-	.1%	- 46.2%
Wood Duck	-	200	-	-	-	200	-	Tr.	-
TOTAL	860,300	561,900	145,000	394,900	153,800	956,800	298,800	100.0%	+ 11.2%

* Flocked ducks are those seen in groups of both sexes.

** Refers only to birds seen as drakes and pairs.

May Coot Populations - Southern Manitoba

<u>Year</u>	<u>Stratum "A"</u>	<u>Stratum "B"</u>	<u>Strata "A" & "B"</u>
1954	6,900	2,000	8,900
1955	16,200	12,300	28,500
1956	27,600	12,400	40,000
1957	15,400	5,400	20,800
1958	52,500	28,400	80,900

May Waterfowl Population Indices, Southern Manitoba Aerial Survey

	<u>Stratum "A"</u> <u>(10,368 sq. mi.)</u>		<u>Stratum "B"</u> <u>(28,600 sq. mi.)</u>		<u>Strata "A" & "B"</u> <u>(38,968 sq. mi.)</u>	
	Pairs & Drakes	Flocked Ducks	Pairs & Drakes	Flocked Ducks	Pairs & Drakes	Flocked Ducks
1951	472,800		165,900*		638,700*	
1952	343,200		177,300		520,500	
1953	209,400		151,600		361,000	
1954	317,100		228,300		545,400	
1955	345,100		424,200		769,300	
1956	417,200		499,600		916,800	
1957	420,300		440,000		860,300	
1958	561,900	145,000**	394,900	153,800**	956,800	298,800**
Average						
1951-1958	385,900		310,200		696,100	

* Stratum "B" data not corrected for absent hens in 1951.

** Flocks of drakes and hens of species normally breeding in the area and not assumed to be migrants.

Percent Lone Males of Pintail, Mallard and Canvasback - 1956-1958

<u>Year</u>	<u>Stratum "A"</u>	<u>Stratum "B"</u>	<u>Strata "A" & "B"</u>
1956	73.7%	83.6%	79.4%
1957	86.5%	91.5%	89.2%
1958	80.0%	84.6%	81.9%

SOUTHERN MANITOBA - ContinuedProduction Indices

There is practically no change in the brood index between 1957 and 1958. On the other hand, the late nexting index (those birds seen as singles or pairs), used as an indication of continued nesting effort, increased 21 $\frac{1}{4}$ % indicating that considerable nesting was still taking place during the period of the survey. The age class distribution of the broods also bears this out. The percentage of broods in age class I for both strata was the second highest for the years 1954 to 1958, averaging 51.5%. This indicates that the survey was conducted in the early part of the brood season for the bulk of the population and that there are probably more broods to come.

There is no significant decreases in the late nexting index for any species. While this is probably a valid indicator of continued nesting effort for most species, it is probable that the nesting season of the canvasback was for all practical purposes over at the time of the survey.

Due to the very conspicuous tendency this year for birds to moult on the potholes rather than in the larger marshes, there may be pre-moulted or moulting birds included in the index, even though every effort was made to record only singles and pairs.

Coot broods showed a slight decrease from 1957, but the index is still well above the average.

A table is included showing the trends since 1954. The duck brood index and late nesting index are the highest for the five-year period in both strata, while coot indices were exceeded only in 1957.

Counts were made on 90 age class II and III broods that were judged to be complete. The number of ducklings per brood is considerably higher than that of previous years.

Comparison of July Brood and Late Nesting Indices
Southern Manitoba - 1957 and 1958

Species	Stratum "A"		Stratum "B"		Strata "A" & "B"		Percent Change 1957-58
	1957	1958	1957	1958	1957	1958	
<u>Duck Brood Index</u>							
All Species	37,700	39,400	22,700	23,400	60,400	62,800	/ 4
<u>Late Nesting Indices</u>							
Pintail	200	2,600	2,800	2,100	3,000	4,700	
Mallard	10,200	14,500	3,700	9,300	13,900	23,800	
Baldpate	200	6,500	-	2,100	200	8,600	
Shoveler	300	800	-	-	300	800	
Gadwall	900	700	-	-	900	700	
B-W Teal	3,100	12,200	-	3,600	3,100	15,800	
G-W Teal	100	500	-	-	100	500	
Scaup	700	8,600	-	2,600	700	11,200	
Canvasback	-	1,700	-	2,600	-	4,300	
Redhead	200	2,600	-	500	200	3,100	
Ringneck	100	1,600	-	-	100	1,600	
Ruddy	1,200	2,400	1,800	3,100	3,000	5,500	
Goldeneye	700	400	-	-	700	400	
Bufflehead	-	300	-	500	-	800	
Black Duck	-	-	-	500	-	500	
Scoter	-	100	-	-	-	100	
 TOTAL	17,900	55,500	8,300	26,900	26,200	82,400	/ 214
 Coot Broods	9,700	7,400	6,500	5,800	16,200	13,200	- 19
 Ponds	241,700	163,300	259,700	341,000	501,400	504,300	/ 1

Age Class Distribution of Broods - 1954 to 1958

Year	Stratum "A"			Stratum "B"			Strata "A" and "B"		
	% in Class I	% in Class II	% in Class III	% in Class I	% in Class II	% in Class III	% in Class I	% in Class II	% in Class III
1954	61.5	33.5	5.0	62.9	20.0	17.1	62.2	26.4	11.4
1955	41.9	30.2	27.9	17.4	43.5	39.1	29.9	36.7	33.4
1956	31.2	41.6	27.2	17.6	50.0	32.4	29.4	42.8	27.8
1957	29.2	43.2	27.6	28.1	56.1	15.8	29.1	44.4	26.5
1958	51.7	34.5	13.8	45.2	45.2	9.7	51.2	35.4	13.5

**Average Size of Class II and III Broods - Southern Manitoba
1954 to 1958**

Year	Number Broods Counted	Young Per Class II & III Broods
1954	26	5.7
1955	28	5.6
1956	no data	5.1
1957	no data	5.6
1958	90	6.6

Conclusions

There will be a considerable increase in the fall flight from Southern Manitoba as compared to 1957.

MINNESOTAWeather and Water Conditions

During May, dry conditions were very evident in the southwest sections of Minnesota.

Moderate to heavy rains occurred in late May and June in both the Northwest and Southwest strata. In the central sections of Minnesota, water was available although levels were low in many lakes. However, steep banks, great depth, lack of vegetation and timber do not lend themselves to good areas for reproduction for some species of waterfowl.

Breeding Population Indices1958 Breeding Population Indices by Strata

Species	STRATA					
	Northwest		Southwest		Total	
	Number	%	Number	%	Number	%
Pintail	1,531	11	7,928	18	9,459	16
Mallard	6,115	44	23,787	53	29,902	51
Shoveler	-	-	720	2	720	1
B-W Teal	6,115	44	9,371	21	15,486	27
Ruddy	-	-	2,882	6	2,882	5
TOTAL	13,761	99	44,688	100	58,449	100

Comparison of the 1958 Aerial Survey Data With That of 1957

Stratum	Population					
	Duck Index		Coot Index		Pond Index	
	1957	1958	1957	1958	1957	1958
Northwest	22,435	13,761	-	505	-	5,229
Southwest	23,122	44,689	-	2,075	-	11,086
TOTALS	46,122	58,450	-	2,580	-	16,315

Percent of change of the 1958 index from that of 1957 + 12.6

MINNESOTA - Continued

Production Indices

Production surveys were made by an aerial crew which covered the same transects that were flown in May. A survey was made also on the Chippewa National Forest Study area. A production survey has been carried out on this study area each year since 1937. The data collected during both surveys are as follows:

Minnesota Mid-July Aerial Survey 1958

	Northwest	Southwest	State Total
Size in Square Miles	12,386	24,910	37,296
Sample Size in Square Mi.	13.5	51	64.5
Broods Actually Seen	5	16	
Broods/Square miles	0.37	0.31	0.33
Brood Index	4,583	7,722	12,305
Sample Late Nesting Index	5	9	
Late Nesting/Square Mile	0.37	0.18	
Late Nesting Index	4,583	4,484	9,067
Ponds Actually Seen	120	416	
Ponds/Square Mile	8.9	8.2	
Pond Index	110,235	204,262	314,497
Coot Broods Seen	2	6	
Coot Brood/Square Mile	0.15	0.12	
Coot Brood Index	1,858	2,989	4,847

Late Nesting Index

Species	Northwest	Southwest	Total	% Comp.
Mallard	-	2,242	2,242	24.7
Baldpate	-	2,242	2,242	24.7
Unidentified	4,583		4,583	50.6
TOTALS	4,583	4,484	9,067	100.0

MINNESOTA - Continued

Brood Size Class	OBSERVED IN SAMPLE		INDEX		Ave. Size
	# Broods	# Ducklings	# Broods	# Ducklings	
II	13	69	7,636	40,471	5.3
III	5	28	3,300	18,480	5.6

Comparison of 1957-1958 Mid-July Aerial Survey in Minnesota

	1957	1958	% Change
Broods Actually Seen	22	21	
Broods/Square Mile	0.35	0.33	
Brood Index	12,566	12,305	- 2.1
Late Nesting Index	14,030	9,067	- 35.4
Pond Index	339,892	314,497	- 7.5
Coot Brood Index	4,148	4,847	+ 16.8
Average Brood Size			
Class II	6.6	5.3	- 19.7
Class III	5.3	5.6	+ 5.7

MINNESOTA - Continued

Number of Adults and Juveniles Seen During 1957-1958
Chippewa National Forest

Species	Adults	Juveniles	Ratio	Adults	Juveniles	Ratio
Mallard	145	267	1:1.8	415	714	1:1.7
Baldpate	149	170	1:1.1	122	246	1:2.1
Goldeneye	62	245	1:3.9	45	172	1:3.8
B-W Teal	14	5	1:0.4	35	131	1:3.7
Ringneck	16	0	1:0.0	7	6	1:0.8
Wood Duck	5	0	1:0.0	26	48	1:1.9
Other	6	30	1:5.0	29	0	1:0.0
TOTAL	397	717	1:1.8	679	1,317	1:1.9

Total Birds Observed and Ratio of Adults to Juveniles
1952 through 1958 - Chippewa National Forest

Year	Total Ducks	Adult/Juvenile Ratio
1952	2,192	1:3.4
1953	926	1:1.6
1954	1,452	1:2.9
1955	1,361	1:2.8
1956	1,985	1:1.6
1957	1,114	1:1.8
1958	2,033	1:1.9

Conclusions

It is anticipated that the fall flight from Minnesota will be about the same as 1957 with some possibility of a small increase.

MICHIGANWeather and Water Conditions

Precipitation was far below normal. The first three months of the year were the driest in Michigan's records. April and May remained dry, but June was normal.

Temperatures were slightly above normal in April, close to normal in May and below normal in June. Agricultural crops were definitely retarded because of the dry conditions and numerous late frosts.

Many ponds and swales were dry, but there is some question whether this situation seriously affected duck production because of the numerous bodies of permanent water in Michigan.

Breeding Population Indices

The potential breeding population compared to the previous years were as follows:

<u>Year</u>	<u>Lineal Miles Censused</u>	<u>Potential Breeders Per Lineal Mile</u>
1949	85	6.80
1950	81	7.91
1951	120	8.18
1952	82	7.13
1953	95.5	12.75
1954	93.5	12.31
1955	111.2	11.00
1956	110.5	11.48
1957	135.4	9.30
1958	121.0	15.00

Comparisons show the potential breeding population was down slightly from that of the last four years but close to the past nine-year average.

The species composition of the potential breeding population as determined on these sample check areas and compared to 1957 follows:

<u>Species</u>	<u>1958</u>	<u>1957</u>
Mallard	24.6	27.7
Black Duck	25.7	23.7
Blue-winged Teal	21.0	19.8
Wood Duck	3.3	4.9
Ring-necked Duck	11.8	7.0
Merganser	2.8	0.3
Goldeneye	1.5	0.5
Pintail	-	0.5
Unidentified	9.3	9.7

MICHIGAN - Continued

Wood Duck Surveys

Breeding population changes for wood duck were determined by float-trip censuses and by percent occupancy of nest boxes. The data collected are as follows:

Float Trips

<u>Year</u>	<u>Lineal Miles Censused</u>	<u>Potential Breeders Per Lineal Mile</u>
1950	81	.17
1951	120	.32
1952	82	.21
1953	95.5	.85
1954	93.3	.58
1955	111.2	.70
1956	110.5	.28
1957	135.4	.46
1958	121.0	.33

Nest Box Occupancy
Swan Creek Wildlife Experiment Station
Allegan County

<u>Year</u>	<u>Boxes Examined</u>	<u>Occupied by Wood Ducks</u>	<u>Percent of Nest Boxes Used</u>
1949	40	9	22.5
1950	35	10	28.6
1951	33	11	33.3
1952	32	4	12.5
1953	26	9	34.6
1954	24	8	33.3
1955	20*	5	25.0
1956	41*	5	12.2
1957	40*	7	17.5
1958	36*	5	11.8

* Metal predator-proof boxes used.

From this information we can see very little change in the number of wood ducks in Michigan.

MICHIGAN - Continued

Production Indices

The brood survey comparisons follow:

Year	Broods Per Lineal Mile	Young Per Lineal Mile	Per Lineal Mile	Average Size of Broods Observed
1949	.47	2.75	6.50	6.00
1950	.34	2.32	5.50	5.87
1951	.35	2.20	3.31	5.76
1952	.70	3.92	3.21	4.60
1953	.51	3.63	4.32	6.10
1954	.20	1.67	4.60	6.24
1955	.64	4.65	5.09	6.28
1956	.53	3.67	4.40	5.86
1957	.38	2.30	4.80	5.10
1958	.31	2.18	6.50	5.97

Broods seen per lineal mile were slightly below those seen the last three years and also fewer than the past nine-year average. The average size of the broods remained equal to past nine-year average. The number of bachelor birds was equal to the highest year on record.

Conclusions

Judging from this information, waterfowl production in Michigan for 1958 was below that of 1955, 1956, and 1957, but without much variance from the average for the past nine years.

OHIOWeather and Water Conditions

This was an exceptionally wet spring and flood conditions were prevalent on most streams throughout June and July. This condition made it necessary to abandon the stream survey program during this year. As a result, the wood duck nest box checks are the only "indicator" to the trend in the production of this species in Ohio during 1958.

Breeding Population and Production Indices

There were 1,226 wood duck nest boxes checked in Ohio during the last two weeks of June. Of this number only 1,024 were in useable condition. Two hundred and forty-one (23.53 percent) were utilized by wood ducks for nesting. This is an increase of 21 percent over the previous year when the degree of utilization was 19.50 percent.

Ohio Wood Duck Nest Box Checks - 1958

	Total Boxes Checked		Useable Boxes		Used by Wood Duck		Percent Used		Percent Difference
	1957	1958	1957	1958	1957	1958	1957	1958	
Northwest	332	239	332	227	67	57	20.18	25.11	+ 24
Northeast	115	137	104	109	19	32	18.27	29.36	+ 61
Southeast	324	280	267	217	36	24	13.48	11.06	- 18
Central	343	309	305	269	62	84	20.33	31.23	+ 52
Southwest	213	261	120	202	36	44	30.00	21.78	- 27
TOTALS	1,327	1,226	1,128	1,024	220	241	19.50	23.53	+ 21

Conclusions

On the basis of the wood duck nest box checks it appears that there will be an increase over the previous year in the wood duck production in Ohio.

INDIANABreeding Population Indices

The reproductive success of the wood duck has received primary consideration, and has been investigated by systematic coverage on nine stream sections totaling 143 miles. The stream sections and methods have been unchanged since 1952, and essentially unchanged since 1950.

Three stream sections totaling 47 miles have been covered between April 24 and May 9 in 1952, 1953, 1955, 1956, 1957, and 1958. Eighty-four males and 37 female wood ducks were observed this year. Observed males were 87 percent above the figure for 1957, and 47 percent above the previous five-year average. Observed females were 118 percent above those of 1957, and 58 percent above the previous five-year average. No wood duck broods were observed on the preliminary survey this year, compared to one brood in 1957, and two broods in each of 1956 and 1955.

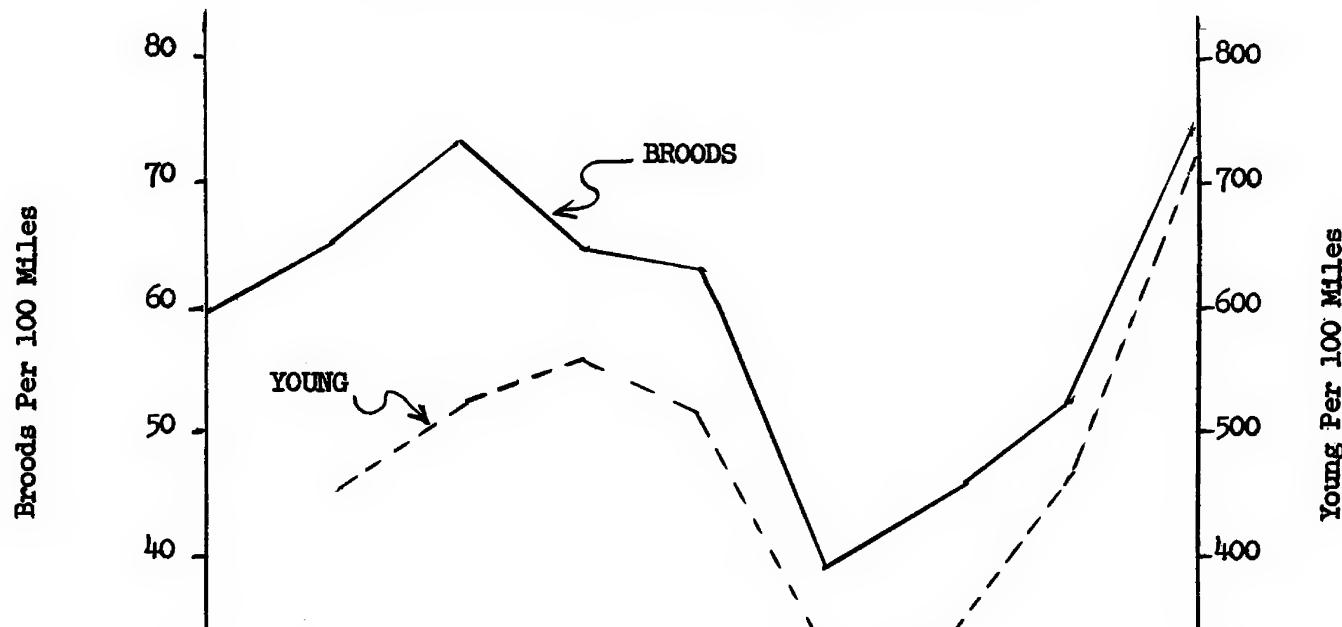
Production Indices

Nine stream sections totaling 143 miles have been covered between May 22 and June 20, since 1950. A total of 98 wood duck broods was observed this year. This figure has been adjusted upward to 106 broods in this report, for the following reasons. Water levels were considered satisfactory for brood-counts on seven of the nine stream sections. On June 10 the Iroquois River Section was in flood and one brood was observed. It is believed that the adult population observed on this float justifies an estimate of at least four broods for this section, which is the previous six-year average. On June 12 the Maumee River section was also in flood, and only one brood was observed. Again it is believed that the adult population observed, and the responses of several flushed females, justifies an estimate of at least six broods for this section, which is also the previous six-year average.

The adjusted brood-count of 106 broods is 41.4 percent over 1957, and 32.5 percent above the previous six-year average. Whole counts were obtained on 67 broods. Brood size averaged 9.7 and ranged from one to 16 (Figure 1).

Brood age distribution for the 98 broods observed indicates the timing of the floats was fair to good, with a slight skewness toward the younger age groups: I-a, 8; I-b, 28; I-c, 28; II-a, 23; II-b, 9; II-c, 2; and III, none.

WOOD DUCK BROODS AND YOUNG PER 100 MILES OF COMPARABLE
STREAM SECTIONS - INDIANA 1950 THROUGH 1958



Year	1950	1951	1952	1953	1954	1955	1956	1957	1958
Broods Per 100 Miles	59.2	64.2	72.3	63.6	62.2	39.2	46.2	52.5	74.2
Average Brood Size ¹	-	7.1	7.1	8.8	8.3	8.6	7.3	8.9	9.7
Young Per 100 Miles	-	456	513	560	516	337	337	467	720

¹ Average brood size determined from whole counts only.

INDIANA - Continued

Conclusions

All indications point to a very successful reproductive season so far, for the wood duck in Indiana. Reports from almost every section are favorable. This is the third successive year showing an increase in the wood duck brood-count, since the low of 1955. This year, three of the nine stream sections had brood-counts exceeding their respective all-time high counts, six of the nine have equaled or exceeded their respective figures for 1957, and six, including the two estimated at the average, have equaled or exceeded their respective six-year averages. Brood size is also at an all time high, however, a portion of this may be a reflection of the greater number of broods in the younger age classes.

IOWAWeather and Water Condition

Many prairie marshes remain dry because of the semi-drought conditions of the last few years. However, except for some severe local flooding, weather and water conditions have been excellent for waterfowl production and survival.

Breeding Population and Production Indices

Emphasis has been placed upon the study of the wood duck because the production of this species in Iowa is of importance to the flyway population. The blue-winged teal and mallard are common nesters, but not numerically of great importance to the flyway. During 1958, nesting pintails have appeared in Iowa's lake region in the largest numbers observed during the past nine years. Total pintail production in this State is only a "drop in the bucket," but the response of this species to local habitat (phenological) conditions in 1958 may be indicative of a widespread dispersal of this species throughout other suitable fringe areas of its range.

The wood duck production trend in Iowa appears upward in 1958. Stream survey data and nesting box checks indicate this, but the data are too limited to provide an estimate of the percentage of increase.

The trend of blue-winged teal and mallard production in Iowa appears upward. More of these ducks have been observed during 1958 than in any nesting season since 1951.

Conclusions

Total production, with the exception of pintails, is still below the peak production year of 1951 in Iowa, but is improved over 1957.

MISSOURI

Breeding Population and Production Data

Tables 1 and 2 show nesting efforts and trends of wood ducks, mallards, and blue-wing teal since 1953. Conservation agents, Federal-Aid biologists, State area managers, and Federal refuge supervisors censused 6,871 acres of marsh and 613 miles of stream in the 1958 survey. We had a 16 percent increase in acres of marsh censused over 1957 but due to high water in many southern streams there was a 20 percent drop in miles of stream surveyed.

Wood duck nesting efforts per square mile of lake and marsh (Table 2) increased by 55 percent over the 1957 figure. The chart shows a jump from 3.8 attempts per square mile to 5.9.

This increase is partially due to the high rate of production on a few of our State managed areas. Duck Creek Public Shooting Area in southeast Missouri reported a 41 percent usage on 81 wood duck boxes. During 1957 there was a 37-1/2 percent usage on 56 boxes. Fourteen broods were reported observed on the Duck Creek area during the 1958 survey.

The Trimble Wildlife Area, located in Northwest Missouri, also reported an increase in wood duck usage. Seven broods were reported using 150 acres of marsh with one brood containing 22 young.

Even though we had a few area that reported high productivity, nesting success over most of the State remained at the 1957 level.

Wood duck nesting success on the stream of the State took a slight increase. The six year low on stream surveys occurred in 1956 when nesting attempts dropped to .10 per mile of stream. 1957 shows a very slight increase to .13 with 1958 still increasing to .15 (Table 2).

Average numbers of ducklings in Class I age group increased by 28 percent or a 2 ug. per brood average. Class II age group remained approximately the same as in 1957. The Class III group increased by 23 percent.

Mallard nesting efforts per square mile of marsh and lake have fluctuated from 2.5 in 1955 to 6.5 in 1957. This year there was a decrease in nesting efforts of mallards to 3.0 per square mile. Although fewer lone drakes, lone hens and pairs were observed in 1958, we did have a slight increase in mallard broods observed.

Conclusions

It is estimated that the fall flight of wood duck from Missouri will be about the same as 1957 but there will be a decrease in the flight of mallard and blue-winged teal.

Table 1--Nesting Efforts of Wood Duck, Mallard, and Blue-winged Teal, Waterfowl Nesting Survey,
South and North Missouri, June 1-15, June 15-30

6871 Acres of Lake and Marsh	Lone Drake	Lone Hen	Pairs	No.	Broods Total Young	Average Young Per Brood	Total Nesting Effort	Nesting Effort per Square Mile
Wood Duck	7	14	6	37	290	7.8	64	5.9
Mallard	13	6	6	3	15	5.0	28	2.6
Blue-winged Teal	-	1	3	1	2	-	5	.46
Lake and Marsh Totals	20	21	15	41	307	6.4	97	8.9
								Nesting Effort per Mile of Stream
613 Miles of Stream								
107								
Wood Duck	21	24	16	30	224	7.5	91	.15
Mallard	13	9	1	2	18	9.0	25	.04
Blue-winged Teal	1	-	2	-	-	-	3	.005
Stream Totals	35	33	19	32	224	8.25	119	.19
GRAND TOTAL	55	54	34	73	531	7.3	216	

Table 2--Trend Data, Wood Duck Nesting Survey, 1953-1958

	1953	1954	1955	1956	1957	1958	Per Cent Change
Acres of lake and marsh censused	4976	4931	7110	2222	5897	6871	+ 16
Miles of stream censused	371	581	666	564	774	613	- 20
Nesting effort per sq. mi. of lake and marsh	5.8	4.4	3.6	3.1	3.8	5.9	+ 55
Nesting effort per mile of stream	.24	.22	.13	.10	.13	.15	+ 15
Number of broods (stream)	42	31	28	23	37	37	-
Broods per mile of stream	.09	.04	.03	.04	.04	.04	-
Av. No. ducklings, Class I	4.9	5.8	7.3	6.3	7.0	9.0	+ 28
Av. No. ducklings, Class II	4.4	7.2	6.2	5.8	6.0	6.3	+ .05
Av. No. ducklings, Class III	4.6	-	-	7.0	6.1	7.5	+ 23
Av. No. ducklings, all classes	4.5	6.5	6.7	6.4	6.1	7.6	+ 24

Table 3--Trend Data, Mallard and Blue-winged Teal Nesting Survey, Missouri, 1953-1958

	1953	1954	1955	1956	1957	1958	Per Cent Change
Acres of lake and marsh	4976	4931	7110	2222	5897	6871	+ 16
Miles of stream censused	371	581	666	564	774	613	- 20
Nesting effort per sq. mile of lake and marsh	4.0	2.7	2.5	-	6.5	3.0	- 53
Nesting effort per mile of stream	.19	.12	.03	-	.07	.04	- 42

Atlantic Flyway DataWaterfowl Kill Information

The following table presents the estimated number of waterfowl bagged and waterfowl knocked down but not retrieved during the 1956-57 and 1957-58 shooting seasons as determined by the Waterfowl Hunter Mail Survey:

Species	1957-1958	1956-1957	Percent Change 1956-1957 to 1957-1958
Black	288,311	344,725	- 16.36
Mallard	262,220	279,810	- 6.29
Canvasback	72,888	98,604	- 26.08
Wood Duck	74,853	83,073	- 9.89
Scaup	107,972	75,906	+ 42.24
G-W. Teal	60,096	67,177	- 10.54
B-W. Teal	39,860	52,091	- 23.48
Am. Wigeon	77,117	48,453	+ 59.16
Pintail	58,833	43,833	+ 34.22
Goldeneye	35,852	40,142	- 10.44
Redhead	28,226	39,873	- 29.21
Merganser	43,959	38,404	+ 14.46
Ring-necked	31,740	34,902	- 9.06
Scoter	35,709	32,100	+ 11.24
Ruddy	16,722	26,119	- 35.98
Bufflehead	38,064	23,641	+ 61.01
Shoveler	11,452	6,830	+ 67.67
Gadwall	11,998	6,425	+ 86.74
Others	5,466	4,944	+ 10.56
Total Ducks Retrieved	1,301,338	1,347,052	N.C.
Total Ducks not retrieved	288,708	411,277	- 29.80
Total Duck Kill	1,590,046	1,758,329	- 9.57
Canada Goose	98,365	58,898	+ 67.01
Brant Goose	16,355	6,251	+ 161.64
Other Geese	792	955	- 6.96
Total Geese Retrieved	115,513	66,104	+ 74.74
Total Geese not retrieved	15,444	12,793	+ 20.72
Total Goose Kill	130,952	78,897	+ 65.98
Total Coot Retrieved	97,313	105,694	- 7.93
Total Coot not retrieved	26,280	24,687	+ 6.45
Total Coot Kill	123,593	130,381	- 5.21

Atlantic Flyway Data

Number of Hunters, Average Times Hunted, Seasonal Bag, Seasonal Unretrieved Kill
and Daily Bag as Determined by the Waterfowl Hunter Mail Survey

		1957-1958	1956-1957	Percent Change 1956-1957 to 1957-1958
Number of Potential Hunters				
Over 15*		357,130	377,689	- 5.44
Under 16		19,212	23,746	- 19.09
		376,342	401,435	- 6.25
Number of Active Hunters**				
Over 15		299,618	308,957	N.C.
Under 16		13,844	17,556	- 21.14
		313,462	326,513	- 4.00
Average Times Hunted**		4.157	4.272	N.C.
Average Seasonal Bag**				
<u>Over 15</u>	Ducks	4.263	4.240	N.C.
	Geese	.378	.209	+ 80.86
	Coot	.313	.307	N.C.
<u>Under 16</u>	Ducks	1.746	2.108	- 17.17
	Geese	.172	.091	+ 89.01
	Coot	.251	.622	- 59.65
Average Seasonal No. not retrieved**				
<u>Over 15</u>	Ducks	.937	1.290	- 27.36
	Geese	.049	.040	+ 22.50
	Coot	.082	.065	+ 26.15
<u>Under 16</u>	Ducks	.579	.730	- 20.68
	Geese	.053	.029	+ 82.76
	Coot	.20	.255	- 52.94
Average Daily Bag**				
<u>Over 15</u>	Ducks	1.025	.993	N.C.
	Geese	.091	.049	+ 85.71
	Coot	.073	.072	N.C.
<u>Under 16</u>	Ducks	.420	.493	- 14.81
	Geese	.041	.021	+ 95.24
	Coot	.060	.146	- 58.90

* Individuals who purchased a Duck Stamp with intent to hunt.

** Individuals who hunted at least once.

Winter Trend Data - Atlantic Flyway

Weather conditions during the period when the winter survey was conducted were not particularly favorable. Therefore, there is some possibility that part of the decrease in wintering population that was recorded was due to adverse survey conditions rather than less birds. On the basis of coverage of the same areas during 1957 and 1958 there was a 25 percent decrease in ducks, a 10 percent decrease in geese, a 22 percent increase in brant, a 31 percent decrease in swan, and a 37 percent decrease in coot. Species composition and percent change by individual species are presented in the table which follows. In the graph which follows are presented trends in duck, goose, brant, swan, and coot populations for the Atlantic Flyway for the period 1949 through 1958. The data have been adjusted for comparable coverage between years.

In the graph it will be noted that there has been a general trend downward in the duck populations, which reached a peak in 1953. The present level of duck populations is well below the average for the past 10 years.

Species Composition - Atlantic Flyway - 1957 and 1958
(Comparable Coverage)

Species	Percent of Birds Identified		Percent Change
	1957	1958	
Coot	16.3	13.3	- 36.7
Scaup	16.1	17.1	- 17.9
Black Duck	11.6	8.8	- 41.1
Canada Goose	9.8	10.9	- 14.0
Mallard	9.7	5.7	- 54.4
Pintail	5.8	6.2	- 16.3
Canvasback	4.8	2.6	- 57.3
Am. Brant	4.3	6.8	+ 22.4
Baldpate	2.8	3.9	+ 5.9
Ringneck	2.6	2.4	- 28.5
Redhead	2.4	3.9	+ 24.0
Scoter & Eider	2.4	4.0	+ 31.8
Goldeneye	2.4	1.3	- 58.4
Ruddy	1.6	3.9	+ 91.0
Merganser	1.1	1.4	- 0.8
Whistling Swan	1.1	1.0	- 30.8
Green-winged Teal	1.0	1.8	+ 35.9
Snow Goose	.9	1.6	+ 33.1
Gadwall	.8	1.1	+ 8.6
Shoveler	.7	.4	- 48.0

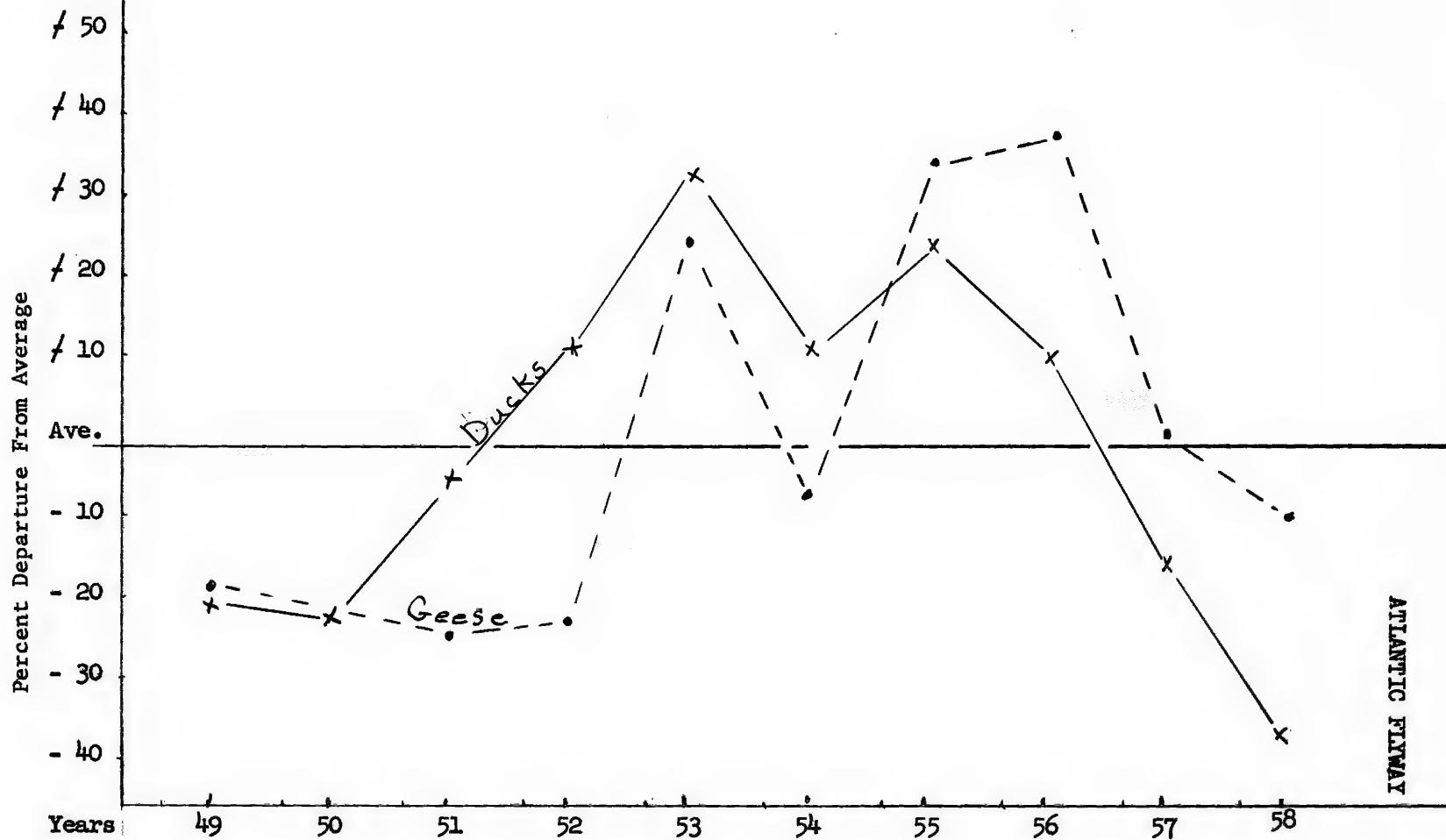
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Species Composition - Atlantic Flyway - Continued

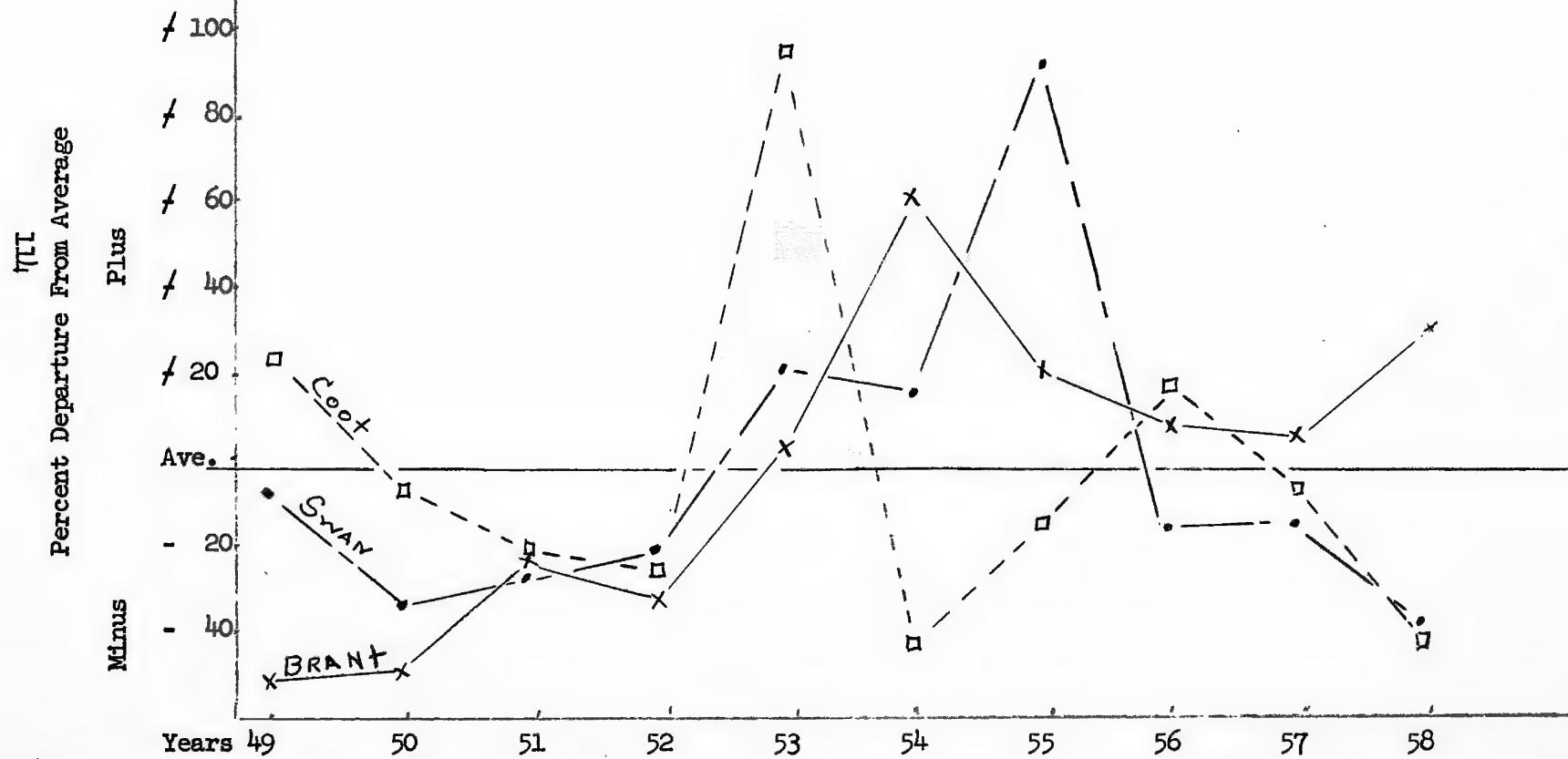
Species	Percent of Birds Identified		Percent Change
	1957	1958	
Bufflehead	.6	.8	+ 12.3
Old Squaw	.5	.3	- 53.2
Wood Duck	.5	.4	- 29.7
Blue-winged Teal	.2	.4	+ 8.3
Blue Goose	Tr.	Tr.	-
TOTAL	100.0	100.0	- 23.5

Trend in Duck and Goose Populations in Atlantic Flyway
1949 Through 1958 (Comparable Coverage)

CTT



Trend in Brant, Swan and Coot Populations in Atlantic Flyway
1949 Through 1958 (Comparable Coverage)



MARITIME PROVINCES:Weather and Water Conditions

In general spring was early in the Maritimes; about two or three weeks earlier than 1957. Mean monthly temperatures from January to May inclusive were above normal in all three provinces. However, there was considerable variation in precipitation and water levels in the three provinces.

Except for March, total monthly precipitation from January to May was excessive in Nova Scotia and New Brunswick. The combination of above normal temperatures and excessive precipitation (snow in northern N.B.) resulted in a larger than usual April run-off and water levels have remained high during May and June as a result of the continued excessive precipitation. Flood conditions prevailed in parts of N.B. and N.S. during the last two weeks of April; residents in the Saint John River valley experienced one of the worst floods in over twenty years. In contrast, April and May were dry months on Prince Edward Island with deficiencies in monthly precipitation of 30 to 40 percent occurring in most areas. There were no flood conditions on the island and spring run-off was about normal.

Some flooding of Black Duck nests may have occurred in N.B. and N.S. early in the season; however, field surveys in June and July indicate that weather and water conditions generally in the Maritimes have been favourable for nesting waterfowl.

Breeding Population Data

A comparison of the counts obtained during the spring breeding-pair survey (Table I) indicate no appreciable changes in the Black Duck and Goldeneye breeding populations. However, both the spring pair and summer brood surveys (Tables 1 and 2) suggest an increase in the breeding population of Ring-necked Duck; a return to the 1956 population level. The suggested decreases in Teal and Pintail breeding populations are of the same magnitude as last year's decreases. Due to the small number of birds (Teal and Pintail) observed, the counts obtained in our surveys are probably not reliable indices of changes in breeding population.

TABLE I

Spring waterfowl inventory, Maritime Provinces, 1957 and 1958 (Comparable data for principal breeding species)

Type of Survey	Year	<u>Black Duck</u>	<u>Ring-n. Duck</u>	<u>Golden- eye</u>	<u>B.W. Teal</u>	<u>Pin- tail</u>	Species
Aerial	1957	1,257	134	136	77	79	
	1958	968	185	132	43	4	
Ground	1957	679	148	145	71	39	
	1958	855	220	140	63	57	
Total	1957	1,936	282	281	148	118	
	1958	1,823	405	272	106	61	
Percentage Change		-6	/44	-3	-28	-48	

Production Data

(a) Black Duck

Brood averages are very close to the 1957 averages (Table 3). However, the high young to adult ratio (Table 2), and the large number of Class III broods observed on the survey suggests that production in 1958 will exceed both 1957 and 1956 production.

(b) Ring-necked Duck

Thirteen broods of this species were observed on the transects this year as compared to two broods in 1957. Although the number of birds observed is small, our data suggest an increase in production from 1957.

(c) Others

The available data suggest that there will be no appreciable changes from 1957 in the production of Goldeneye, Blue- and Green-winged Teal and Pintail.

Table II - Summer brood survey, Maritime Provinces, 1956, 1957 and 1958
 (Comparable data for principal breeding species)

Type of Survey	Area	Year	Black Duck						Ring-n. Duck			Goldeneye			Teal			
						Yg./loo	Ad.	Br.	Yg.	Ad.	Br.	Yg.	Ad.	Br.	Yg.	Ad.	Br.	Yg.
			Ad.	Br.	Yg.	Ad.	Br.	Yg.	Ad.	Br.	Yg.	Ad.	Br.	Yg.	Ad.	Br.	Yg.	
Ground	N.B.	1956	271	27	175	64	59			44	8	50	69	13	93			
	and	1957	223	21	172	77	51			49	12	85	37	4	36			
	N.S.	1958	131	25	195	149	81	5	51	77	16	77	93	11	87			
Aerial	P.E.I.	1956	406	36	234	58	89			45	5	40	123	15	103			
		1957	268	24	170	63	84	2	13	6				83				
		1958	345	42	314	91	1	4						60				

Table III - Average brood sizes by age classes, 1956, 1957 and 1958

Species and <u>Year</u>	Class I		Class II		Class III		<u>Total</u>
	<u>Br.</u>	<u>Av.</u>	<u>Br.</u>	<u>Av.</u>	<u>Br.</u>	<u>Av.</u>	
<u>Black Duck</u>							
1956	25	6.8	43	6.3	4	5.5	72
1957	19	8.7	50	7.7	9	8.0	78
1958	18	8.2	49	7.5	31	6.7	98
<u>Goldeneye</u>							
1956	8	5.6	6	7.0			14
1957	8	5.0	7	9.4	1	8.0	16
1958	8	6.5	8	3.1			16
<u>B.W. Teal</u>							
1956	11	7.6	2	5.0			13
1957	9	9.8	5	8.8	1	3.0	15
1958	7	9.7	6	10.3			13
<u>Ring-necked Duck</u>							
1956							
1957	1	8.0	1	5.0			2
1958	10	9.1	3	10.0			13
<u>Pintail (P.E.I.)</u>							
1956							
1957	1	9.0	2	7.0	1	10.0	4
1958	2	8.0	1	8.0	1	4.0	4

Conclusions

Available data indicate an increase from 1957 in the production of Black Duck and Ring-necked Duck. Production of other species will probably be equal to the 1957 production.

NORTHEASTERN STATES

Weather and Water Conditions

This production season can be characterized as cool and wet. It is a direct contrast to the 1957 season and is in many aspects similar to the 1956 season.

Precipitation during the period of April to July was above normal over most of the northeast; only portions of the Lake Plains were below normal during late May and early June.

Water levels are currently normal or above over all of the northeast.

Vegetation responded to the early spring breakup but was then retarded due to the generally cool days and cold nights. Growth rate has progressed toward "normal" south to north with portions of northern New England still retarded.

In the coastal areas seasonal high tides are reported to have flooded nests in late April and early May.

Breeding Population

Early reports throughout the northeast were generally optimistic. Later, portions of southern New England indicated the breeding population was down. This was particularly true of the Black duck. Ring-necked duck breeding populations were generally considered above last year where this species occurred.

Production Data

While early nesting was the general rule, the apparent success was below normal. Many of the early class I broods observed numbered only one or two young. Most observers feel that the nesting season was prolonged this year. Re-nesting is reported heavy throughout much of the region. In the coastal areas and portions of the interior late broods are noticeably larger.

Brood rearing conditions have been recorded from good to excellent. The continued high water levels have increased the amount of brood cover normally available. Broods have been reported from areas not normally flooded during the area surveys. This has hindered the observers in evaluating production.

The narrative reports of many observers are more optimistic than the data submitted would indicate. This may be due to their inability to accurately count birds under the field conditions current this year.

When considering the data in Tables I and II the foregoing discussion should be taken into consideration.

Table I indicates a rather severe decrease in production for approximately 50 percent of the 121 comparable areas. In some instances this decrease was very small.

Table II from the 110 comparable areas shows a decrease in production for all species except the Ring-necked duck. Brood size is up for all species while the number of young birds shows a decrease. This could be due to the greater rearing success of the June hatched broods.

Conclusions

Interpretation of the data is difficult but pessimistic as follows:

- | | | |
|------------|---|-----------------------------|
| Black duck | - | slight to moderate decrease |
| Wood duck | - | no change |
| Mallard | - | slight decrease. |

TABLE I

Number of Comparable Areas by States Showing Status of Production

<u>State</u>	<u>Comparable Areas</u>	<u>Increase</u>	<u>No. Change</u>	<u>Decrease</u>
Connecticut	46	10	16*	20
Delaware	7	0	0	7
Maine	18	10	1	7
Massachusetts	2	0	0	2
New Hampshire	6	2	1	3
New Jersey	9	5	0	4
New York	5	1	0	4
Rhode Island	19	5	1	13
Vermont	7	5	1	1
West Virginia	2	1	0	1
TOTAL	<u>121</u>	<u>39</u>	<u>20</u>	<u>62</u>

*Includes 11 areas with no ducks observed in 1958 or 1957.

TABLE II -- Summer Brood Survey in the Northeastern States, 1958
 (110 Comparable Areas, Table I)

Species	Total Broods		Young Produced		Average Brood		Percent of Change			
	1958	1957	1958	1957	1958	1957	Young Produced		Broods	
							Increase	Decrease	Increase	Decrease
Black duck	232	318	1,534.6	2,062.7	6.6	6.5	—	25.6	—	27.0
Wood duck	193	224	1,412.0	1,514.5	7.3	6.8	—	6.8	—	13.8
Mallard	76	107	496.4	598.7	6.5	5.6	—	17.1	—	29.0
Ring-necked duck	24	27	177.6	164.0	7.4	6.1	8.3	—	—	11.1
Blue-winged teal	23	35	201.1	290.3	8.7	8.3	—	30.7	—	34.3

SUMMARY OF CONDITIONS

PACIFIC FLYWAY

On the basis of data collected in Alaska, Canada, and the United States only, the wintering population of ducks increased considerably in the Pacific Flyway as compared to a year ago. Small increases for geese and swan were also recorded. There were small decreases in the wintering population of brant and coot.

Data gathered on the breeding grounds supplying the Pacific Flyway supported the increase recorded on the wintering areas. There were considerable increases in the breeding populations recorded in Alaska, Alberta, and the Northwest Territories. Elsewhere the breeding population remained about the same.

For the most part the breeding areas supplying the Pacific Flyway were characterized by an early dry season. In Alaska and northern Canada this type of season is generally favorable to waterfowl production, since the amount and quality of water areas are usually not affected by drought conditions. In much of the Canadian prairie nesting habitat supplying the Flyway drought conditions prevailed until early summer. Beginning in June and continuing in July, sufficient rain occurred to maintain adequate water for brood production. Although water levels were normal to low in Wyoming, they were judged to be very good to excellent in Oregon, Idaho, California, Nevada, and Utah.

Brood surveys in July indicate that this is a record year for production in southern Alberta. In southern Saskatchewan, however, drought conditions were more severe and a decrease is expected. On the basis of an increased breeding population and favorable conditions, production is expected to increase in Alaska, Northwest Territories, northern Alberta, British Columbia, Idaho, Utah, Nevada, and California. Decreases are expected from northern Saskatchewan, Oregon, and Washington.

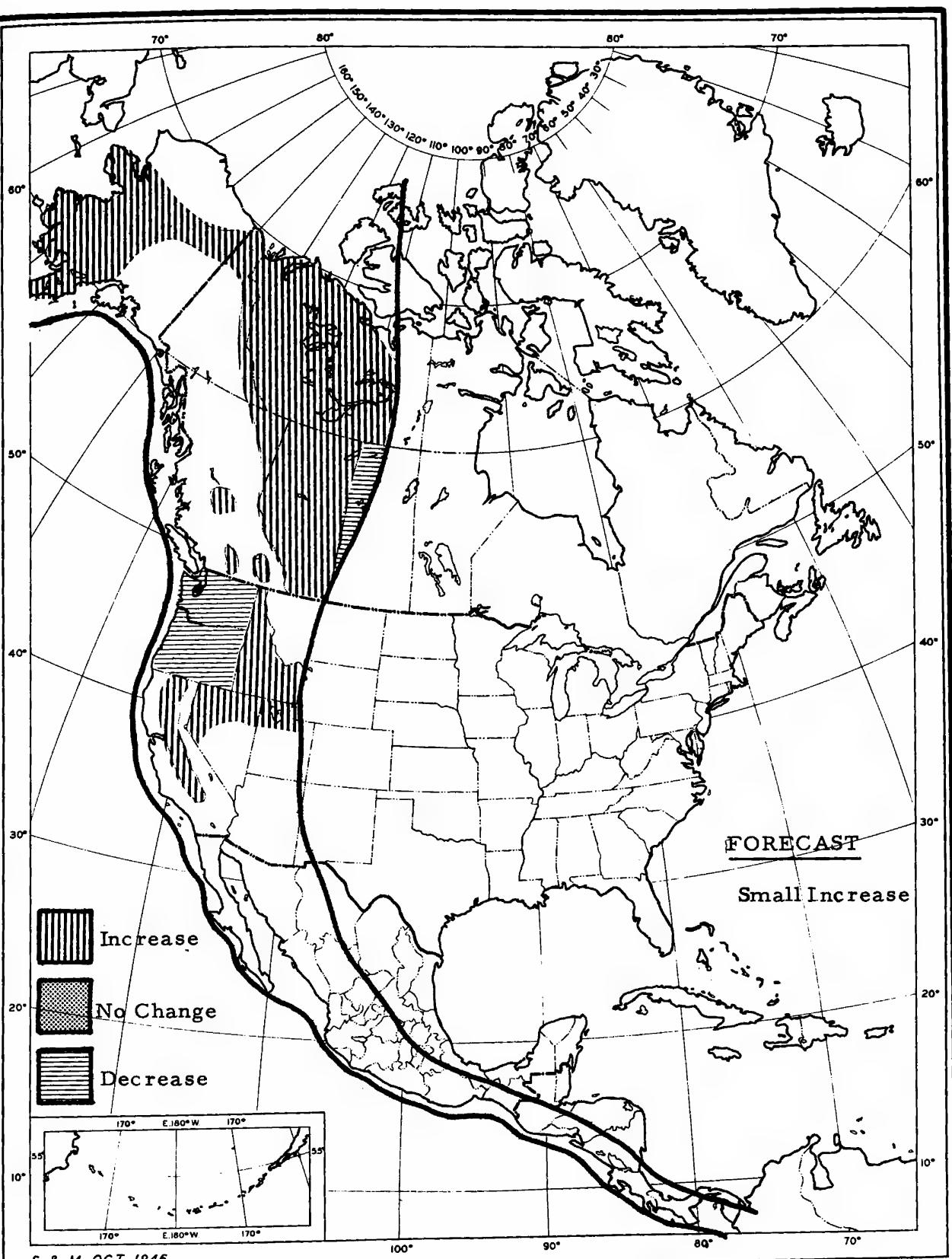
Overall, it is expected that the fall flight of ducks in the Pacific Flyway will show a small increase over last year.

On the basis of a small increase in the breeding population of geese in the Flyway as measured by the winter survey, it is estimated that there will be a small increase in the fall flight of this group of species.

Both the breeding population and production of coot increased in southern Alberta. However, there were marked reductions in both breeding population and production in other important prairie nesting areas. On this basis it is estimated that the fall flight of coot will remain about the same or decrease.

In view of the small decrease in the breeding population of brant, as measured by the annual winter survey, plus the fact that there seems to be a continuing downward trend in the population of this species, it is estimated that there will be a small decrease in the fall flight of brant in the Pacific Flyway.

1958 FALL FLIGHT FORECAST FOR DUCKS
PACIFIC FLYWAY



CENTRAL FLYWAY

Due to circumstances beyond control it was not possible to conduct the annual survey in Mexico during January 1957. Although the Mexican survey was conducted in January 1958, comparisons cannot be made between the two years in this important Central Flyway wintering area. On the basis of coverage within the United States only, there would appear to have been a considerable decrease in wintering populations between 1956 and 1957, and a compensating increase between 1957 and 1958. When the breeding population survey indices are used as an indicator of population trend it appears doubtful that the decrease recorded in 1957 took place. It appears also that although there has been an increase in breeding population within the Central Flyway this year that the increase has been small and not nearly of the magnitude indicated by the winter survey results.

Throughout most of the breeding range affecting the Central Flyway the season was from one to two weeks early. Much of the Flyway breeding range was characterized by drought during the 1958 season. In southern Saskatchewan and North Dakota the effect of the drought was apparently more severe than in either southern Alberta or southern Manitoba. Drought conditions prevailed also in breeding areas further north, but in northern habitat lack of rain can have a favorable rather than a detrimental effect. During June and July, general rains occurred in the Dakotas, southern Alberta, and southern Manitoba. These rains halted the drying trend and improved conditions for brood production. The first general rain in southern Saskatchewan occurred on July 12 and 13 which improved conditions somewhat for renesters but did little to help early hatched broods.

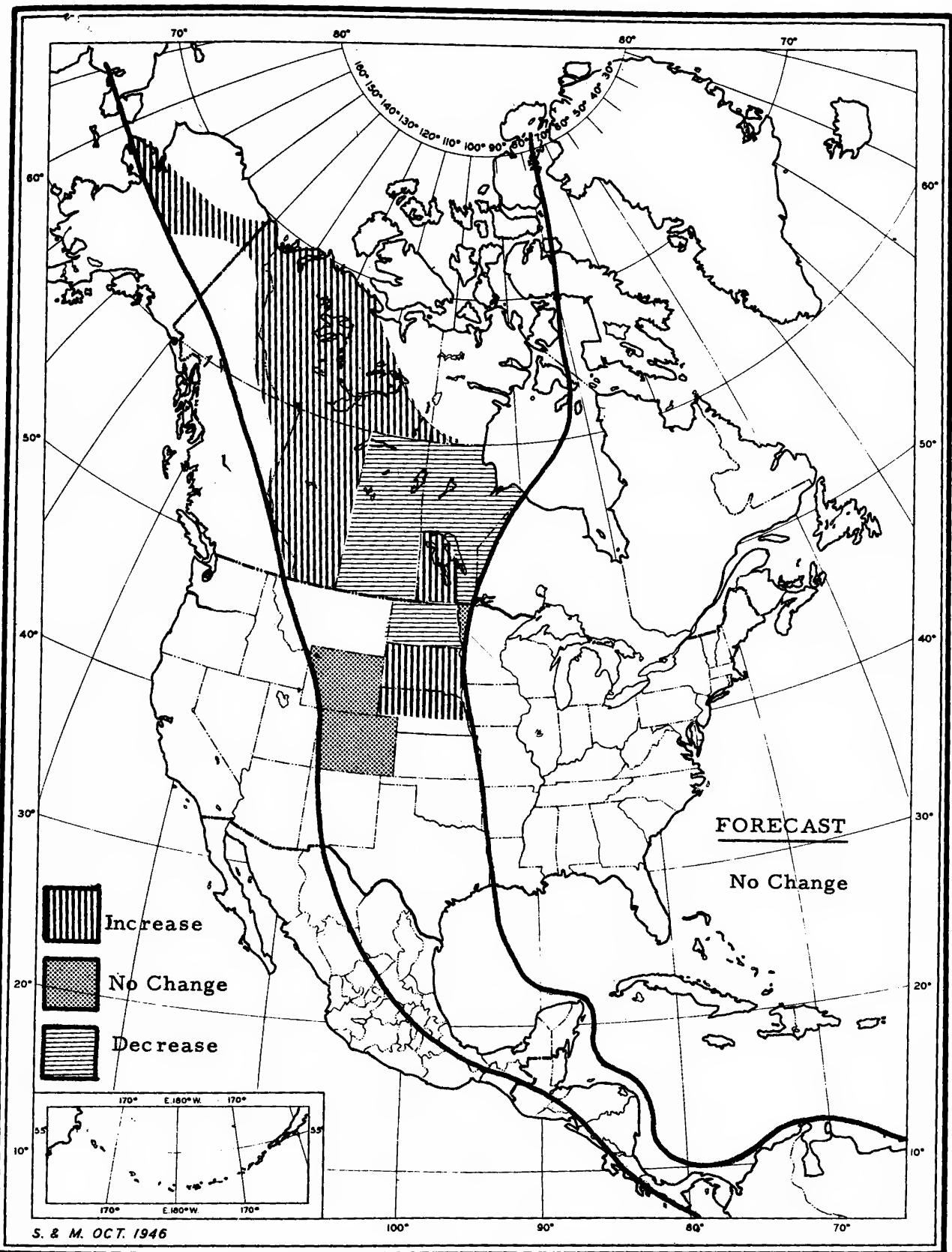
The July surveys revealed increases in brood production in southern Alberta, southern Manitoba, and South Dakota. In view of larger breeding populations and favorable weather conditions, increases in brood production are expected in Alaska and the Northwest Territories. Decreases in production were recorded throughout Saskatchewan and in Northern Manitoba, Ontario, and North Dakota. Production was estimated to be about the same as last year in Wyoming, Colorado, and Minnesota.

Overall, a summation of field reports indicates that there should be no change in the fall flight of ducks in the Central Flyway as compared to 1957.

On the basis of an increase in the breeding population of geese, as measured by the 1958 winter survey, it is estimated that there will be a small increase in the fall flight of this group of species.

Although there was a marked increase in the breeding population of coot in southern Alberta and southern Manitoba, there was a greater decrease in southern Saskatchewan. Also, there was a marked reduction in brood production in southern Saskatchewan and southern Manitoba. Therefore, it is concluded that there will be a moderate decrease in the fall flight of this species.

1958 FALL FLIGHT FORECAST FOR DUCKS
CENTRAL FLYWAY



MISSISSIPPI FLYWAY

The 1958 winter survey in the Mississippi Flyway showed little change in population of ducks and geese as compared to 1957. The wintering population of coot increased considerably although the number of coot wintering in the Mississippi Flyway is relatively small.

On the breeding grounds, surveys during May and June revealed small increases in breeding population in southern Alberta, southern Manitoba, Alaska, Northwest Territories, Ontario, and South Dakota. Decreases were recorded through Saskatchewan, in northern Manitoba, and in North Dakota. The increases exceeded the decreases to the extent that there was a small increase in the breeding population of ducks in the areas supplying the Flyway.

Beginning in 1956 a drying trend developed in the breeding range supplying most of the birds to the Mississippi Flyway. The drought continued and intensified during the summer of 1958, particularly in the important southern Saskatchewan breeding area. The number of water areas available to the birds was much below the average of the past few years throughout the southern portions of the Prairie Provinces and in the Dakotas. There was a lack of rainfall in northern breeding habitat also, but in the far north drought rarely affects the number of water areas and in many instances the conditions associated with lowered rainfall are favorable to waterfowl production. Fortunately, during June and July general rains occurred in southern Alberta and southern Manitoba sufficient to halt the drying trend and provide sufficient water in most localities to carry broods through to maturity. In southern Saskatchewan the first general rain occurred on July 12 and 13. Although water conditions were improved, the rain came too late to help the broods of some early nesters.

The July surveys revealed an increased production of broods in both southern Alberta and southern Manitoba. Production was good also in South Dakota. On the basis of a large increase in breeding population and favorable weather conditions in the Northwest Territories it is anticipated that production will increase in this important area as well. On the other hand, drought conditions were severe enough in southern Saskatchewan and North Dakota that there were marked reductions in brood production. Decreased production is expected also from Michigan and Missouri. Fall flight is expected to be about the same as last year from Minnesota.

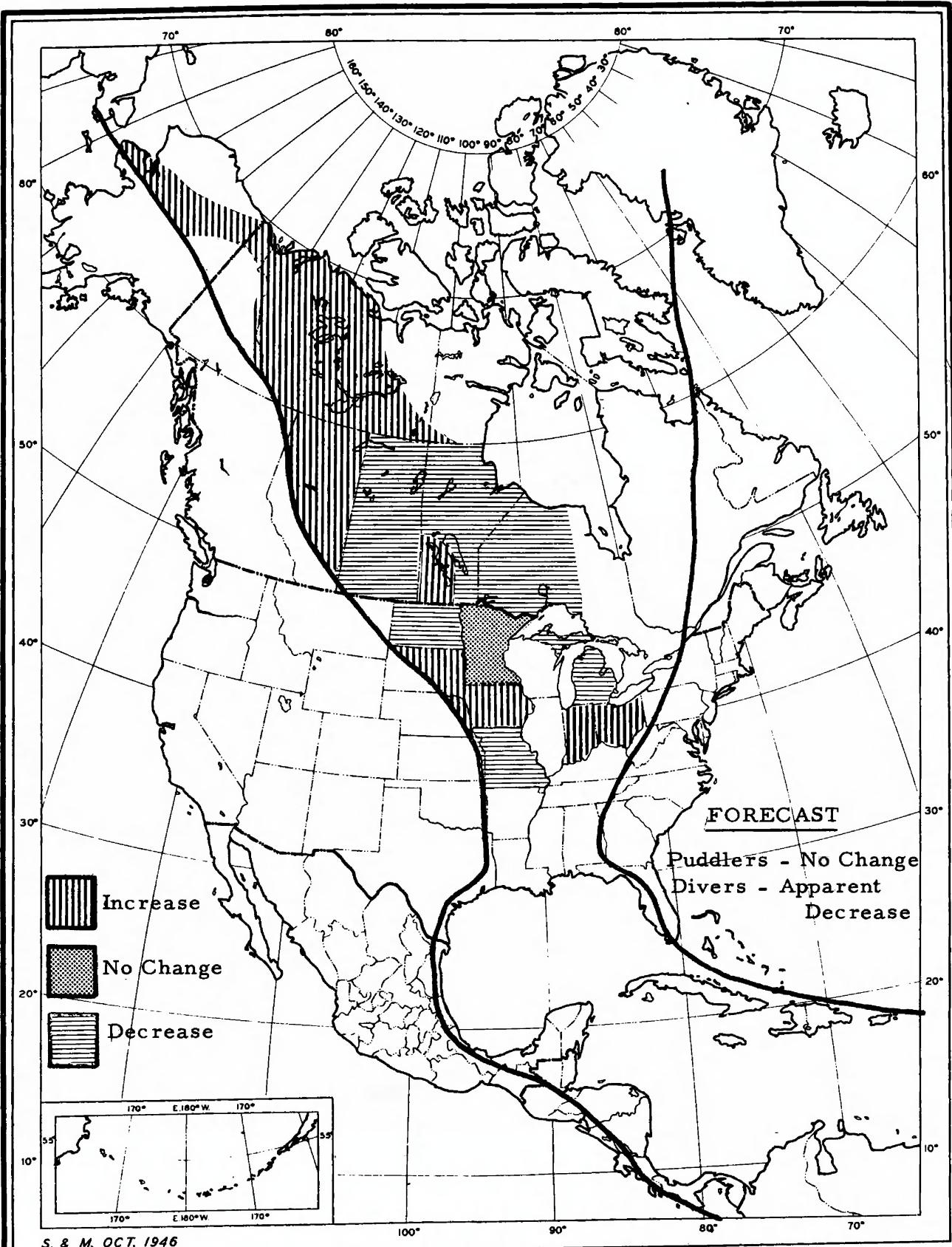
Overall, it is anticipated that the increases will balance the decreases and that the fall flight of puddle ducks in the Mississippi Flyway will remain about the same as in 1957.

Diving ducks appear to be less versatile in adapting themselves to adverse habitat conditions than puddlers and it is estimated that the drought conditions will result in a decrease in the fall flight of this group of species.

On the basis of no change in the wintering population of geese in the Flyway it is estimated that the fall flight of this group of species will remain about the same as last year.

Although the breeding population index for coot increased considerably in North Dakota and southern Manitoba, there was a marked decrease in southern Saskatchewan. In addition, the coot brood index decreased considerably in all breeding areas important to the Mississippi Flyway. Therefore, it is estimated that there will be a moderate decrease in the fall flight of this species.

1958 FALL FLIGHT FORECAST FOR DUCKS
MISSISSIPPI FLYWAY



ATLANTIC FLYWAY

During the ten year period 1949 through 1958 the wintering population of ducks in the Atlantic Flyway gradually increased during the first four years and reached a peak in 1953. The population decreased in 1954, improved somewhat in 1955, and has been decreasing steadily each year since 1955. The 1958 population level is the lowest recorded in the ten year period.

The decrease has occurred in all of the important species. For example, the 1958 black duck index is 41 percent below 1957 and 55 percent below the peak reached in 1953; mallard decreased 54 percent from last year and is 56 percent below the peak; canvasback decreased 57 percent from last year and is 83 percent below the peak; ringneck decreased 28 percent from last year and is 76 percent below the peak; and scaup decreased 17 percent from 1957 and the index is 62 percent below the peak. It is of significance to note that this decrease has occurred at a time when the fall flights in other flyways have either been maintaining their status or increasing.

Unfortunately, the reasons for the population decreases in the Atlantic Flyway are obscure. Breeding population and production surveys have not reached the point where they were judged to be operationally feasible in the important Quebec-Labrador breeding area, and production survey techniques have not been developed for use in the northern portions of the Prairie Provinces or in the Northwest Territories, all of which are important contributors to the Atlantic Flyway population. It is not possible, therefore, to determine whether the decrease has been due to below average reproduction or to overharvest. Regardless, it is necessary to rely heavily on the results of the annual winter survey as a measure of population trend in the Flyway.

In the breeding areas supplying the Flyway where surveys were conducted there were increases in breeding population in Alaska, Northwest Territories, southern Manitoba, and Ontario. Decreases were recorded in Saskatchewan, northern Manitoba, and North Dakota.

Water conditions throughout the western portion of the breeding range supplying the Atlantic Flyway were characterized by drought. Although the drought was of sufficient intensity to decrease expected production from the important southern Saskatchewan area, increases are expected from southern Alberta, southern Manitoba, northern Alberta, and Northwest Territories, and from Alaska. Unfortunately, the bulk of these increases involve species which are not expected to migrate through the Atlantic Flyway.

It is expected, therefore, that there will be a further decrease in the 1958 flight of ducks in the Atlantic Flyway.

On the basis of a 14 percent decrease in the breeding population of Canada geese, as measured by the annual winter survey, it is expected that there will be a small decrease in the fall flight of this species.

On the basis of a decrease in the number of coot recorded during the January 1958 survey and the indications of below average coot production in the southern portions of Saskatchewan and Manitoba, it is estimated that there will be a considerable reduction in the fall flight of this species.

Brant present the only ray of sunshine in an otherwise gloomy outlook. The breeding population of this species as measured in January 1958 increased about 20 percent over 1957 and for the past 5 years has consistently been above the 10-year average. In view of the increase in breeding population it is estimated that there will be a corresponding increase in the 1958 fall flight.

1958 FALL FLIGHT FORECAST FOR DUCKS
ATLANTIC FLYWAY

